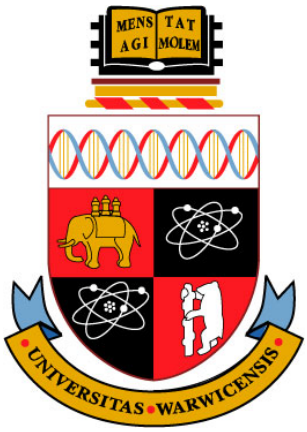
TEAM RELATIONSHIPS, KNOWLEDGE TRANSFER, AND HUMAN RESOURCE MANAGEMENT IN MULTINATIONAL COMPANIES: A COMPARISON OF R&D AND MARKETING

By

Euk Hwan Kim

A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy



The Organisation and Human Resource Management Group

Warwick Business School, University of Warwick

May 2014

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Dedicated to God Almighty

and my family

ACKNOWLEDGEMENTS

I wish to thank my supervisors, Dr. Paul Edwards and Dr. Jacky Swan, for their intellectual support, encouragement and patience, which have made this thesis possible. With their insightful guidance, I was able to gain a great deal of knowledge within my research field which empowered me to complete my PhD studies. It is an honour to be their student, and my respect for them will never diminish.

I am also grateful to my old advisor and teacher, Dr. Jason Shaw and Dr. Travis Tubre, in the Carlson School of Management at the University of Minnesota. What I learned from them in my master's study became a good stepping stone for my research. Their classes in HRM subjects were always amazing and awakened my deep desire for being a good teacher and researcher in the relevant field.

I would also like to thank my family members who have believed in me. My parents and parents-in-law supported me both mentally and financially throughout my studies. My wife and daughters always provided me with dedicated support through both happy and troubled times. The presence and support of my sister's family and sister-in-law were also instrumental in the completion of this thesis.

I finally appreciate the sincere help of old friends and colleagues at work. They have not only been pillars of support and inspiration but also have taught me the true meaning of friendship. Their continued care about me eased my path through life of studying abroad. Financial

support from Warwick Business School and the kind assistance of school staff are also gratefully acknowledged.

My PhD work would have been impossible without the great love and help from everyone. I should like to end by saying that my heart will always stay with them for the rest of my life.

DECLARATION

This is to declare that:

- I am responsible for the work submitted in this thesis.
- This work has been written by me.
- All verbatim extracts have been distinguished and the sources specifically acknowledged.
- During the preparation of this thesis, a conference paper was presented as listed below.

(Conference Publication/Presentation)

Kim, E. H. (2013). Task interdependence and team leadership in MNC knowledge creation: A comparison of R&D and marketing. In Bhuiyan, M. H. (Ed.), *Proceedings of 8th Annual London Business Research Conference, Imperial College, London, UK, 8-9 July 2013* (Paper Number 450). Melbourne, Australia: World Business Institute. Retrieved from http://www.wbiworldconpro.com

- The remaining parts of the thesis are unpublished.
- This work has not previously been submitted within a degree programme at this or any other institution.

Signature: Eu Kim Date: 13/05/2014

ABSTRACT

This study examines the nature of knowledge creation and transfer in multinational companies and the configuration of the human resource management (HRM) system to sustain the relevant practices. It makes three contributions. Firstly, it argues that the nature of knowledge varies according to the organisation of work. Accordingly, it takes two functional activities, research and development (R&D) and marketing, and identifies the distinct processes of knowledge creation in each. Secondly, it also shows that the processes of knowledge transfer vary on the basis of project characteristics. Thirdly, it links debate on knowledge to debate on HRM and issues of 'best practice' or 'best fit'.

This research applies the best fit theory of HRM and the MNC knowledge transfer perspective to explain how and why the sets of HRM practices are configured. The basic premise is that the configurational approach of HRM systems based on different functional contexts is viable to MNC subsidiary settings. The perception of MNC employees confirms that HRM practices should be aligned internally with tasks and bundled to create better outcomes. Comparisons among tasks, work structures, or skill levels make a specific architecture of HRM practices internally-consistent. Investigating the attributes of tasks and work structures is thus necessary for the understanding of HRM systems configured.

Configurational fit related to knowledge processes has been explored mostly through qualitative approaches. This research employs

quantitative approaches as well as a qualitative method to look into how, within the functional areas of R&D and marketing, knowledge is generated and transferred. These processes can be shaped by the industry context as well as the function. The research design thus takes two industries, ICT and automobiles, and looks at the functions within each. This produces a 2x2 research design. The subsidiaries of two Korean firms in each cell, that is eight subsidiaries in total, were studied through 35 interviews. These interviews shaped the design of a questionnaire that generated 558 responses from R&D and marketing employees in these eight subsidiaries plus eighteen others.

In relation to knowledge creation, the study finds that there are greater complexity and interdependence in R&D than in marketing. This is true in both sectors. In relation to transfer, marketing subsidiaries are more embedded in their local context than their R&D counterparts are because marketing is directed at specific national markets while R&D is more related to the development of new products across the MNC as a whole. Factors such as cooperative work structures, work reporting types, information dependence, and decision autonomy in a subsidiary or the relationship with the parent company are identified as critical factors that distinguish R&D from marketing in knowledge processes. They bring about distinctive attributes such as procedural ambiguity, which requires a specific focus to support knowledge processes through the internal alignment of HRM. For example, the nature of performance incentives and the role of training differ between R&D and marketing subsidiaries.

ABBREVIATIONS

CFO – Chief Financial Officer

CHO – Chief HR Officer

GLM – General Linear Model

HPCC – HRM-Performance Causal Chain

HPWP – High-Performance Work Practices

HQ – MNC Headquarters (Parent Company)

HR – Human Resources

HRM – Human Resource Management

H/W – Hardware

ICT – Information and Communications Technology

LED – Light-Emitting Diodes

MANCOVA – Multivariate Analysis of Covariance

MANOVA – Multivariate Analysis of Variance

MKTG – Marketing

MNC – Multinational Company (Corporation)

OLS – Ordinary Least Squares

PRM – Product Road Mapping

Q'naire – Survey Questionnaire

R&D – Research and Development

S/W – Software

TF – Taskforce

TFT – Taskforce Team

CHAPTER 1: INTRODUCTION

1.1 Introduction

Multinational companies (MNCs) have long faced the issue of how to identify and capture knowledge that is created at the level of the subsidiary. Research to date has thrown light on several aspects of this issue. Studies of knowledge creation have identified tacit and explicit dimensions of knowledge and links between them. Research on MNCs has addressed systems of transfer. Rather different literatures have examined the human resource management (HRM) practices of MNCs. This study contributes to such research by linking them together. In particular, it shows that knowledge creation differs according to the nature of the task, that processes of transfer depend on various contingencies of the task and its organisation, and that HRM processes also vary in relation to the configuration of tasks. The main purpose of this chapter is to introduce my research scope and objectives. The whole research is shaped within the scope of MNC knowledge transfer and HRM. HRM configurational fit based on the task nature, team relationships, and control structures of R&D and marketing is the core of the matter.

My research defines the target population as high performance ICT and automobile MNCs that have a high annual profit on the basis of

Fortune Global 500. Then it focuses on what features high performance MNCs reveal in work structures and how they are linked to HRM configurations. Knowledge procedural factors in their R&D and marketing subsidiaries are thus explored as dependent variables.

Chapter 4 explores the local knowledge context of MNC R&D and marketing. Chapter 5 investigates the cross-national knowledge context of MNC R&D and marketing. Chapter 6 looks into how differently high performance HRM practices form a bundle based on the perception of employees to support knowledge processes in R&D and marketing. Then the key factors of those knowledge procedural contexts are qualitatively linked to knowledge-driven HRM bundles. What is the background of these empirical studies and why this thesis takes interests in them are explained in this chapter. This chapter specifically presents answers to why R&D and marketing are important in the MNC knowledge transfer and HRM literature and why ICT and automotive industries are explored to observe knowledge processes. The thesis structure and key concepts are introduced in this chapter as well. Therefore, this chapter is expected to be helpful for the understanding of the whole research structure and points.

1.2 Variation between Functions: R&D and Marketing

This research is shaped within the MNC knowledge transfer and HRM literature such as Hocking et al. (2007), Lam (2003), and Minbaeva (2007). This literature is interested in how MNC subsidiaries can be

managed more effectively for project outcomes. There is a question regarding what types of subsidiaries MNCs have. The global main functions of MNCs are R&D, marketing, manufacturing, and finance (Fatehi, 1996). Among these functions, R&D, marketing, and manufacturing have subsidiaries all over the world. Finance, however, tends to be vested in each subsidiary or regional headquarters across sampled large MNCs.

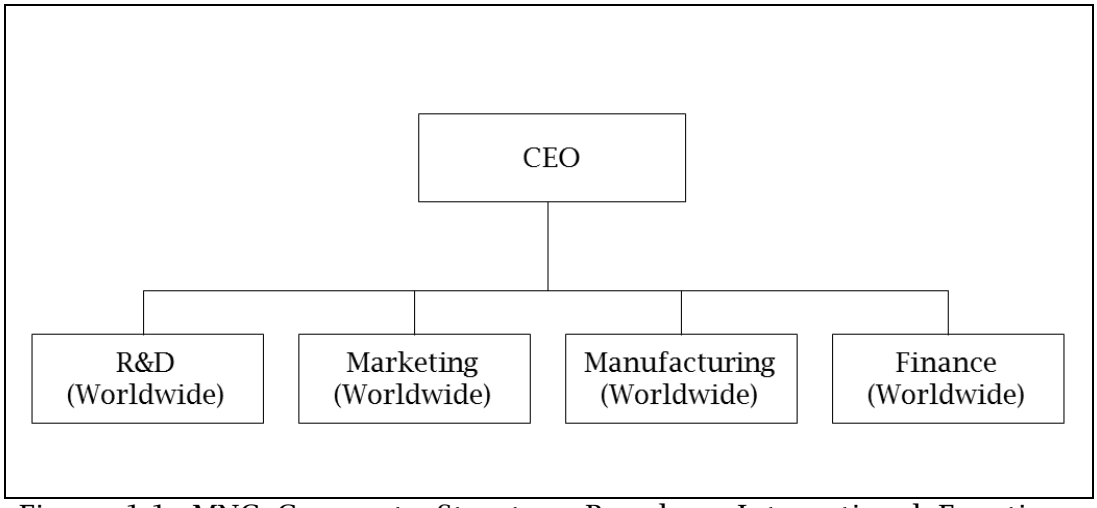


Figure 1.1. MNC Corporate Structure Based on International Functions (Fatehi, 1996)

My research views knowledge as the intermediate and final outcomes of MNC projects. This research does not attempt to study knowledge in all aspects. It addresses knowledge that is generated in projects within subsidiaries and the ways in which it is then embedded in commercial projects. This approach establishes links with much of the MNC literature which, as discussed below, starts with knowledge transfer.

Looking in terms of projects makes connections with this literature, whereas a broader definition would make it harder to discern the links. In the case of manufacturing subsidiaries, the outcomes are tangible products rather than the combination of intangible and tangible knowledge. They are mostly located in Eastern Europe, South America, and Southeast Asia. For these reasons, manufacturing subsidiaries are likely to be ineffective for research fieldwork. R&D and marketing subsidiaries become the comparison targets of this research, and academic background on these functions are explained again in the next chapter.

This research looks at large firms that have distinct subsidiaries with R&D and marketing functions. The foreign subsidiaries of high performance MNCs are operated more independently than smaller MNCs are. For example, Philips does not operate R&D and marketing functions in a single subsidiary. R&D centres are independent of marketing subsidiaries named business corporations. Small MNCs can have both functions in a subsidiary as traditional functional design (Lasserre, 2007), but bigger MNCs tend to separate them. HR and finance are normally involved in those subsidiaries as support functions. In MNCs, functions such as R&D and marketing are typically described as knowledge intensive, in that, knowledge is both the major input and output. In other words, they rely heavily on knowledge which is an intangible asset. In comparison, functions such as finance and manufacturing rely on more tangible assets (e.g. money and products). It follows that, to be high

performing, R&D and marketing require HRM practices that support the processing and production of knowledge. Therefore, the investigation of high performing R&D and marketing functions in subsidiaries can give us a good insight into what kinds of HRM systems are needed to support knowledge processes.

1.3 Knowledge Intensive MNCs

There is a reason why this research explores ICT and automobile industries. Knowledge intensive industries are expected to have more plentiful R&D and marketing projects. The Organisation for Economic Co-operation and Development (OECD) identifies knowledge based industries on the basis of R&D intensities. A summary of knowledge based manufacturing sectors according to the OECD definition is set out in the table below. The OECD definition indicates a substantial part of knowledge based industries. It includes high tech sectors such as pharmaceuticals, aerospace, and advanced electronics as well as the medium-high tech sectors such as chemicals, cars, and other engineering industries.

BERR[1] statements normally combine the high tech and medium-high tech sectors as a single high-tech sector. High and medium-high tech industries provided about 10 per cent of total value added across knowledge based industries in 2005, according to the European Union (EU)

[1] BERR means the Department for Business, Enterprise and Regulatory Reform, a United Kingdom government department.

estimates[2] (Brinkley, 2009). At this point, knowledge based industries include non-manufacturing industries such as knowledge intensive service sectors as well as manufacturing industries. Service industries are not investigated in this research because they do not have formalized subsidiaries of R&D and marketing. MNCs in high and medium-high tech manufacturing industries are thus worthy of notice as knowledge intensive firms when knowledge processes are explored.

High-Technology	Medium-High-Technology
1. Aerospace	6. Motor vehicles
2. Computers, office machinery	7. Electrical machinery
3. Electronics-communications	8. Chemicals
4. Pharmaceuticals	9. Other transport equipment
5. Scientific instruments	10. Non-electrical machinery
Medium-Low-Technology	**Low-Technology**
11. Rubber and plastic products	19. Paper printing
12. Shipbuilding	20. Textile and clothing
13. Other manufacturing	21. Food, beverages, and tobacco
14. Non-ferrous metals	22. Wood and furniture
15. Non-metallic mineral products	
16. Fabricated metal products	
17. Petroleum refining	
18. Ferrous metals	

Table 1.1. OECD Classification of Manufacturing Industries[3]

MNC knowledge transfer literature has enjoyed exploring three industries in high tech and medium-high tech sectors. For example, Kotabe et al. (2003) and Zhao et al. (2005) investigate the US, Japanese,

[2] EU KLEMS database. OECD definitions of knowledge based industries

[3] They are classified according to the R&D intensity and relevant statistics are from ISIC Revision 2 and NACE Revision 1.1. ISIC is the United Nations' international standard industrial classification of all economic activities. NACE is derived from la nomenclature statistique des activités économiques dans la Communauté européenne (French). It means the statistical classification of economic activities in the European Communities.

and Chinese automotive MNCs. Kotabe et al. (2007) and Wang et al. (2004) employ American and Danish pharmaceutical corporations to review international knowledge flows. Lam (2003) investigates MNC knowledge transfer from foreign R&D networks in two different pharmaceutical and ICT industries. All of these three sectors are recognized as a knowledge intensive high-tech sector by BERR. My research follows these researchers in examining ICT and automobile sectors. Accessibility to data in conducting research fieldwork was a major consideration in choosing the sectors.

1.4 Research Structure

This research first describes differences between R&D and marketing, then carries out a multivariate analysis, and finally control for other possible influences, notably the country of origin of the parent company. On the basis of such a methodological approach, it thematically explores three main areas: local team features in knowledge creation, cross-national control structures for knowledge transfer, and HRM fit to support these knowledge processes. What it does through empirical chapters is to compare R&D and marketing functions in multinational companies to identify how they differently organise local team features and cross-national control structures, and perceive HRM practices for knowledge transfer.

This research thus unpacks each of those three areas into some relevant factors and treats them in turn as described in Table 1.2. Chapter

4 explores five local team features in knowledge processes and then Chapter 5 looks into cross-national control structures in knowledge processes, as dependent variables affected by categorical variables. Chapter 6 identifies HRM sets helpful for the knowledge processes on the basis of the opinion and experiences of R&D and marketing employees. Table 1.2 reveals which factors empirical chapters investigate mainly. The key messages and implications for the thesis for practitioners, including drawing out the findings on HRM practices linked to knowledge processes, are discussed further in Chapter 7.

Independent Variables	Dependent Variables	
How R&D and marketing differently (or similarly) organise or prefer:	Team socializing (H 4.1 to 4.4) Work reporting types (H 4.5 and 4.6) External partner types (H 4.7) Task interdependence (H 4.8) Leadership styles (H 4.9)	Ch. 4
	Information dependence (H 5.1) Geographic proximity (H 5.2) Knowledge sharing frequency (H 5.3) Knowledge transfer methods (H 5.4) Decision autonomy (H 5.5 and 5.6)	Ch. 5
	Individual vs. Group (H 6.1 and 6.2) Performance-free vs. Performance-based HRM (H 6.3 and 6.4) Employee Skill training vs. Leadership training (H 6.5 and 6.6)	Ch. 6

Table 1.2. What Empirical Chapters Investigate

The key is that this research does not aim at testing what factors affect knowledge transfer. Instead, it brings factors that affect knowledge transfer, from previous studies, and then explores how R&D and marketing organise them differently.

A questionnaire survey and interviews intended for project team members in the R&D and marketing subsidiaries of 14 high performance MNCs are conducted. All of sample MNCs have an impressive performance of about 10 billion dollars in annual revenue. In particular, MNCs involved in interviews are highly ranked in Fortune Global 500 with over 70 billion dollars in revenue. Through the combination of quantitative and qualitative approaches, differences between R&D and marketing regarding dependent variables are investigated in Chapter 4, 5, and 6. Different features in the local team relationships and work structures of MNC foreign subsidiaries are examined in Chapter 4. Cross-national control relations and work structures between subsidiaries and their parent companies are reviewed in Chapter 5 for the same purpose. The findings can be useful information for the fit-related internal alignment of HRM. Measurement items used by previous studies based on Nonaka's knowledge creation model[4] and additional items gained from preliminary interviews are employed to investigate the relationships and structures.

This research also addresses HRM fit to identify distinctive HRM systems that support knowledge processes. The distinctive bundles of high performance HRM practices that support work structures in MNC projects are identified in Chapter 6. These bundles in different types of subsidiaries become convincing evidence of configured HRM systems.

[4] This research does not directly test or develop the Nonaka's model but borrows measurement items that have been used to apply the model into organisational processes in previous studies.

Measurement items for this investigation are derived from previous studies that have been aimed at identifying HRM practices linked to high performance. The details of previous studies are mentioned in the methodology chapter. Chapter 7 qualitatively re-analyses the findings of Chapter 4, 5, and 6 to get useful information for the fit-related internal alignment. This objective is realized by liking distinctive features in MNC project performance identified in Chapter 4 and 5 to the HRM findings of Chapter 6.

1.5 Key Concepts

1.5.1 Knowledge

The focus is on project knowledge, which is the following types related to specific projects: experiences, ideas, application skills, know-how applied directly into projects, and project outcomes. The focus is not on knowledge in general.

– Tacit Knowledge

Tacit knowledge means unwritten and unspoken knowledge based on emotions, experiences, insights, or some other internalized information (Nonaka and Takeuchi, 1995). In this research, it refers to knowledge that exists within a project, as in phrase like ‘take place among team members’.

– Explicit Knowledge

Explicit knowledge is articulated knowledge expressed and recorded as words, numbers, codes, and formulae. It is easier to store and distribute this knowledge, which is found in books, on the web, and through other visual or oral means (Nonaka and Takeuchi, 1995). In this research, it refers to the intermediate and final outcomes of MNC projects.

– Complex Knowledge

On the basis of Hansen (1999), Teece (1986), Winter (1987), and Zander and Kogut (1995), complex knowledge is defined as knowledge including non-coded tacit nature as much as it makes employees in other teams hard to understand.

1.5.2 Knowledge Processes

This term refers to the whole process of knowledge creation and transfer through MNC projects. In other words, the knowledge process is the overall system for the creation and transfer of knowledge. It explains how MNC projects are performed in both home and host countries.

– Knowledge Creation

This term refers to subsidiary activities performing their tasks for a specific project through local team relationships and work structures. The concept focuses on the internal work conditions of subsidiaries but includes the relationship with external networks involved in specific MNC projects to provide a part of knowledge as well.

– Knowledge Transfer

This term refers to cross-national activities between MNC foreign subsidiaries and their parent companies (or other subsidiaries) to share information or outcomes for a specific project. The concept focuses on the cross-national work conditions and relationships between them.

1.5.3 MNC Projects

This term refers to formal projects, of which plans are shared with the parent company, for technological and business developments in R&D and marketing subsidiaries. They are aimed at creating subsidiary outcomes and the parent company is involved in the projects directly or indirectly as this time.

1.5.4 Project Teams

This term refers to all MNC subsidiary teams involved in project task forces. A temporary team may be created newly for a specific task force. In contrast, task force members may work in different permanent teams in forming a virtual team for the task force. MNC subsidiary teams in both cases are recognized as MNC project teams.

1.6 Research Background and Scope

In my previous work experience, my company designed HRM practices in the top-down way and different work features between

subsidiaries were not considered in HRM. In particular, the company used the same set of HRM practices for R&D researchers and marketing employees without considering their work differences, but the basic salary was normally higher for R&D researchers than marketers. My question was how employees from different functions could be motivated in the same way. Lam's articles treating the configurational fit became the starting point of my research.

In the perspective of MNC knowledge transfer and HRM configurational fit, Lam (2000, 2003) provided inspiration for this PhD research and there were some critical points to initiate new research. Lam (2003) investigates knowledge transfer from foreign R&D networks as the learning activities of MNCs in the pharmaceutical and ICT industry. She thus focuses on relations with local academic institutions in host countries and influential conditions between home and host countries because she is interested in how knowledge is shared effectively.

As a result, Lam (2003) explores HRM strategies to manage local universities and transnational learning in the US and Japanese MNCs. The findings show that the locally-embedded US model has greater local autonomy and the home-oriented Japanese model has greater local control over subsidiaries. Her study contributes much to understanding of HRM configurations through the two different HRM models. However, it investigates R&D subsidiaries and their external networks only. She looks more at knowledge transfer than creation, studies external links rather than internal ones, and considers only within one functional area.

Briefly, previous studies in the MNC knowledge transfer and HRM literature have weaknesses in the limited exploration of knowledge creation processes and local team relationships in knowledge processes, in the insufficient discussion of what roles and discretion MNC subsidiaries take, and in the limited explanation of how HRM supports knowledge processes across learning sites. These issues shape my research questions linked to empirical chapters. Those previous studies concentrate on R&D and we need to look at another function to see how far we can generalize from R&D.

1.7 Research Questions and Objectives

This thesis asks how knowledge transfer is organised across different functions (R&D and marketing) of a multinational firm and what kinds of HRM practices support the knowledge transfer process. This question is split into three to be investigated in each empirical chapter separately. The first question for Chapter 4 is how R&D and marketing organise tacit and explicit knowledge through team relationships in the knowledge creation process. The second question for Chapter 5 is what types of autonomy R&D and marketing organise in foreign subsidiaries and what they do in the knowledge transfer process. The last question for Chapter 6 is how R&D and marketing employees perceive HRM practices and what HRM practices support their knowledge processes.

In addressing HRM support for processes of knowledge creation and transfer, my research focused on the perceptions of respondents in

the two activities of R&D and marketing. This research did not look at the views of HR professionals or at the HR architecture as such. To have embraced these wider aspects would have enlarged the scope of the study beyond what was feasible. The objective was to consider what aspects of HRM, from the point of view of respondents themselves, sustain their work activities. The approach was consistent with studies of HRM that address how practices are perceived and interpreted by people subject to them. Was it the case, for example, that people who work in R&D value particular aspects of HRM, for example an appraisals system geared to rewarding team work, while those in marketing may value more individualized appraisal and reward systems?

My findings here suggest that such differences exist and this fact is consistent with a contingency model of HRM. Such findings in themselves are not especially original, though they add to the picture of differences between the two functions. My main contribution lies in dissecting knowledge creation and transfer processes and in showing that they are configured differently in the two functions.

1.8 Themes

Above all, this research links team relationships to knowledge processes. Hansen (1999) stresses the importance of strong and weak ties in different sorts of knowledge processes. When sharing complex knowledge across units within a multiunit firm, strong ties are beneficial. These strong inter-unit ties assist project teams to accelerate the transfer

of complex knowledge, whereas weak ties are only useful when knowledge is not complex (Hansen, 1999). In order to explain effective knowledge sharing, Hansen (2002) also establishes inter-unit relations between different units in a firm as knowledge networks.

Björkman et al. (2004) and Schulz (2003) have similar views when examining inter-unit relations in terms of social interactions or social relations. These concepts are used like the inter-unit ties of Hansen (1999) as a factor promoting or impeding intra-MNC knowledge flows. While exploring social interactions, Persson (2006) and Subramaniam and Venkatraman (2001) specify the scope of inter-unit ties as team ties. They insist that cross-border knowledge flows are influenced by cross-national team interactions. This is why reviewing team relationships in an MNC knowledge transfer study is essential. My study extensively explores MNC team relationships in the knowledge creation process as well as the knowledge transfer process.

The review of team relationships figures out distinctive task nature and work structures in R&D and marketing. Themes explored in distinguishing R&D from marketing clarify many points missed by looking only at R&D. They reveal where the contribution of this research to the MNC knowledge transfer and HRM literature will lie. Empirical and theoretical contributions are to knowledge complexity and weak ties, MNC control structures, and the configurational fit of MNC HRM in relation to the following themes.

Firstly, it has been popular to compare ties between cross-national R&D units when the origins of two firms are different. The different levels of inter-unit ties based on different organisational management strategies or cultural differences have been identified. For example, when internal integration is emphasized in an MNC, stronger cross-national ties between a subsidiary and its headquarters (HQ) can be observed clearly (Lam, 2003). However, distinctive local team ties related to task nature such as explicit and tacit knowledge have been unclear by focusing on R&D and the effect of the home country. Structural ties and knowledge explicitness need to be reviewed together in knowledge sharing (Hansen, 1999). To examine the tacit and explicit nature carefully, local team relationships in the knowledge creation process can be important in the knowledge transfer study. My research thus chooses R&D and marketing in expecting them to differ in terms of knowledge complexity and task interdependence.

Secondly, the local embeddedness of MNC foreign subsidiaries and its effect on knowledge transfer to the parent company have been investigated in the knowledge transfer and HRM literature. Power relations and control structures between subsidiaries and HQ have also been a popular topic in a similar vein. For example, the locally-embedded US model shows an HRM setting based on greater local autonomy. In contrast, the home-oriented Japanese model indicates an HRM setting based on greater local control (Lam, 2003). Subsidiary types and corporate control over them are particularly identified on the basis of the

different levels of knowledge inflows and outflows in Gupta and Govindarajan (1991). Comparing R&D and marketing in relation to these themes is important to better understand cross-national work structures. For example, an MNC project can be more effective by getting closer to a specific national market in R&D or marketing contexts. My research thus chooses R&D and marketing in expecting them to differ in terms of local embeddedness and subsidiary autonomy.

Finally, MNC knowledge transfer and HRM studies have focused more on the best practices of HRM rather than the best fit of HRM. Minbaeva (2008) investigates HRM practices that affect the motivation of knowledge receivers and knowledge transfer. Her focus is not on HRM configurations but the identification of best practices related to intrinsic and extrinsic motivation. Her other studies regarding absorptive capacities also find out the best practices of HRM that support knowledge absorption. HRM configurations aligned with distinctive tasks and work structures are not likely to be easily identified when only R&D subsidiaries are explored. HRM configurations identified by Lam (2003) are linked to organisational strategies for dealing with international R&D and its external research networks. However, they do not reflect different types of tasks such as R&D and marketing projects. My research expects that R&D and marketing have distinctive HRM features such as individual-based and group-based settings.

1.9 Concluding Comments

This thesis presents empirical evidence of HRM configurations that have not been clarified in MNC knowledge transfer and HRM studies. The discussion chapter also provides reference materials for the internal HRM alignment of MNCs by linking findings in Chapter 4 and 5 to the HRM configurations of R&D and marketing. These materials can be useful for future action research that applies HRM settings designed by findings to an organisation and observes their effects. According to Minbaeva et al. (2009), future studies in the MNC HRM and knowledge transfer link must have a deeper understanding of team interactions in knowledge processes. My research empirically contributes to the literature by looking into local team relationships as well as cross-national work structures. Previous studies that initiate this research are reviewed in the following chapter.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Knowledge transfer between MNC subsidiaries and their parent companies has been investigated in many studies of human resource management perspectives during the past 10 years. Studies such as Mahnke et al. (2005), Minbaeva et al. (2003), and Vance and Paik (2005) focus more on the relation between HRM and knowledge creation issues such as absorptive capacities and local networks. Others such as Björkman et al. (2004), Gupta and Govindarajan (1991), and Vance et al. (2009) take more interests in the relations between HRM and knowledge transfer issues such as expatriation and control structures. They reveal that international HRM should be designed sophisticatedly and supportively for MNC performance. However, there are few studies that explore both local creation and cross-national transfer simultaneously. This research focuses more on the configurational fit of HRM systems linked to knowledge processes. HRM configurations themselves have been studied theoretically in a large part (Delery and Doty, 1996) but also studied empirically in Ichniowski et al. (1997). MNC knowledge transfer studies, nevertheless, rarely explored HRM configurations.

2.2 Knowledge-Driven HRM Configurations

The equally effective combinations of HRM practices were theoretically developed in Arthur (1992) and Miles and Snow (1984). They argue that there are different HRM or employment systems that can result in high performance. MacDuffie (1995) also presented the specific configurations of HRM systems. The concept of HRM systems has been recognized as multiple bundles or sets that equally create firm effectiveness or performance. My research brings the configurational perspective of HRM to the MNC knowledge transfer literature. MNC knowledge transfer and HRM configurations have rarely been investigated together in previous studies. In this combined perspective, my research is particularly inspired by Lam (2003). Lam's study identifies two different HRM models in relation to the transnational learning of MNCs. These models are based on differences between the US and Japanese MNCs in managing local universities as scientific knowledge providers.

A notable point in the HRM configurations of Lam (2003) is to focus on the learning of MNC subsidiaries. The study does not try to look into the specific learning activities but carefully examines linkages with local labour markets as knowledge providing pools. Japanese firms focus more on internal knowledge creation and integration between subsidiaries and the parent company. Local scientific personnel are viewed as external R&D agents that expatriates have to monitor. Local recruitment is not very important in this case but organisational integration for effective knowledge transfer to home is more important.

In contrast, the US firms focus more on extending the scope of knowledge sourcing to local labour markets. HRM's focus on local scientific personnel is very important to gain collegial players for knowledge creation in this case (Lam, 2003).

Similarly, my research is interested in integrating the learning of local employees and its transfer to the parent company. However, it enters the area of team relationships in knowledge processes for MNC projects. A question regarding why team relationships should be focused on in a knowledge transfer study can be raised at this point.

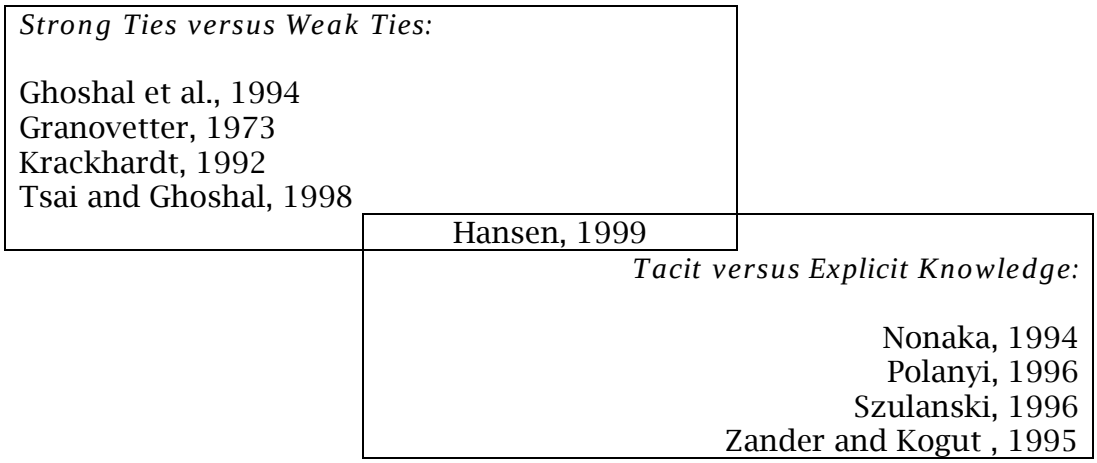


Figure 2.1. Two Aspects of Knowledge Transfer

Hansen (1999) addresses strong and weak ties between knowledge creation units in dealing with tacit and explicit knowledge. Strong ties are useful for sharing complex knowledge across units within a multiunit firm. These strong inter-unit ties help project teams speed up the transfer of complex knowledge, whereas weak ties are only useful when knowledge is not complex. Weak inter-unit ties, however, help a

project team search for useful information in other units (Hansen, 1999). Hansen (2002) also establishes inter-unit relations between different units in a firm as knowledge networks to explain effective knowledge sharing.

Björkman et al. (2004) and Schulz (2003) similarly look at inter-unit relations in terms of social interactions or social relations. They reveal that inter-unit interactions influence knowledge inflows and outflows between a local subsidiary and the parent company. Their concepts are used similar to the inter-unit ties of Hansen (1999) as a factor promoting or impeding intra-MNC knowledge flows. Persson (2006), and Subramaniam and Venkatraman (2001) specify the scope of inter-unit ties as team ties while exploring social interactions. They argue that cross-national team interactions influence cross-border knowledge flows. Reviewing team relationships in an MNC knowledge transfer study is thus important. My study extensively explores MNC team relationships in the knowledge creation process as well as the knowledge transfer process.

At this time, it is critical to consider not only how to support local employees to develop new valuable knowledge in foreign subsidiaries but also how to effectively bring it to develop a new product for the MNC. Investigating and improving previously-identified knowledge creation models are not a goal of this research. Knowledge creation models are employed to assist exploring local team relationships and work structures in MNC projects. My research look at knowledge creation processes in the specific context of defined projects, and not at knowledge in general. Tacit-explicit knowledge nature and particular

structures created in the local team relationships have not been explored even in Lam (2003) and Minbaeva et al. (2003) while linking subsidiary learning to HRM. These studies mainly focus on the relationships with external knowledge networks or capabilities to manage them. However, knowledge nature and particular structures created in the local team relationships are critical because they can affect knowledge transfer and HRM configurations.

2.3 Knowledge Types in MNC Knowledge Transfer and HRM Studies

Knowledge treated in MNC knowledge transfer studies has been R&D technologies mainly. R&D employees in foreign subsidiaries create necessary technological knowledge pieces so that they can build a product. Many relevant studies pay attention to the local contexts of knowledge creation such as institutional issues and local networks. They look at how to interact with local agents through shared experience and how to manage local context and rules related to knowledge creation. In particular, it is important to establish collaborative relationships with external research institutions and manage local labour markets. The external networks of foreign R&D subsidiaries should not be treated as outside actors separated from firm strategies (Lam, 2003). How HRM is distinctively formed to manage MNC subsidiaries and local research institutions are explored from four different home-based models created by Lam (2000). The locally-embedded US model shows an HRM setting based on greater local autonomy. In contrast, the home-oriented Japanese

model indicates an HRM setting based on greater local control (Lam, 2003). At this time, technological knowledge resources undoubtedly come from R&D human resources and thus HRM settings are critical for the development of new knowledge.

A noticeable fact is that innovation has been a familiar topic related to technological knowledge for several years. However, innovation can be observed in non-technological sites as well as technological institutions (Daft, 1978; Kimberly and Evanisko, 1981). One of the critical points in Lam (2003) is the focus on R&D in investigating organisational and HRM strategies linked to transnational learning. Innovation has been considered as an exciting topic related to technological knowledge in a great deal of studies for several years. Lam (2003), in like manner, fits the innovation issues of MNCs to R&D activities across borders. However, innovation can be viewed in two different learning sites: technological and administrative units. Kimberly and Evanisko (1981) look into innovation issues in both of the administrative and technological environment. In this case, administrative knowledge is recognized as managerial policies, allocation of resources, HRM practices, and the structuring of tasks (Daft, 1978). Creating a new sales manual can be an example of innovation activities to structure tasks in the marketing unit. These facts reveal that even other knowledge resources except R&D knowledge cannot be underrated. Therefore, the focus on R&D creates a gap in case comparisons by missing other kinds of learning sites. A

problem is that particular valuable knowledge, which may be the key of successful business, can be overlooked through the gap.

There is an additional issue that causes a gap in case comparisons. Lam (2003) examines the differences of knowledge sourcing according to firm-origin. A point to take is that it makes a 4-way comparison between cases: a Japanese-pharmaceutical case, a Japanese-ICT case, an American-pharmaceutical case, and an American-ICT case in the UK. For the case comparison, it has only one firm in each segment whereby it might not represent the features of the segment very well. It is thus hard to know whether results can be generalized widely or are specific to the individual firm studied. This fact means that it discloses the only piece of causality because it becomes more complex in a phenomenon by environmental factors (Fleetwood and Hesketh, 2006). Two or more case companies in each can improve the validity of comparisons. The variations of functional and industrial contexts can strengthen the case comparison as well.

A point of Locke and Thelen (1995) can be applied to my comparative frame. They clear up comparison issues in different environments in terms of apples and oranges. Fruit packing systems in different places may be analogized plainly to such a form of comparison. When how fruit is put into boxes under different productive systems is compared, the fruit might be apples in a case but oranges in another. It means that comparing different substantive themes is meaningful because they might have a similar aspect. In my research, fruit packing

systems become knowledge generation systems and types of fruit become functional types of knowledge such as R&D and marketing. Then my research can compare R&D in a firm with a different function in another when investigating the knowledge generation process in different environments. On the basis of the difference of learning sites, a research model can reveal more meaningful information on causal factors in knowledge processes. Knowledge creation, transfer, and HRM issues in knowledge processes are more reviewed in the following sections.

2.4 R&D and Marketing in MNC Knowledge Transfer and HRM

A few previous studies such as Ruekert and Walker (1987) and Souder and Moenaert (1992) emphasize linking both R&D and marketing to firm business strategy. A research model by Souder and Moenaert (1992) particularly suggests the integrated management of R&D and marketing personnel within innovation projects. These studies focus on the relations between R&D and marketing as different individual or department roles in an organisation. They are viewed as management objects for intra-organisational effectiveness but are not explored as foreign subsidiaries. At the subsidiary level, MNC knowledge transfer and HRM literature focused on R&D subsidiaries. The marketing function is highly dependent on MNC knowledge transfer to facilitate worldwide value creation for competitive advantage across the parent company and its subsidiaries (Schlegelmilch and Chini, 2003). However, most previous studies in this field mainly review manufacturing or R&D subsidiaries

despite the importance of a marketing function in knowledge transfer (Riesenberger, 1998; Schlegelmilch and Chini, 2003).

These subsidiaries can be recognized a little differently in MNC HRM studies. Manufacturing subsidiaries are mostly located in the low cost labour market such as Eastern Europe, Southeast Asia, South America, and China. For this reason, international HRM settings for manufacturing subsidiaries are basically formed from low cost strategy. The choices of HRM practices are relatively limited by less financial support and more contingent workers in this situation. HRM settings based on subsidiary knowledge contexts are likely to be stiff rather than flexible. In this respect, R&D and marketing subsidiaries are more appropriate to investigate HRM fit for better work processes. The configurative effect of HRM practices can be clearer in these subsidiaries. R&D and marketing subsidiaries are also located worldwide, including the UK and the US. It is thus easier for English-based research to figure out the real intention of employees in these subsidiaries. To return, Ruekert and Walker (1987) and Souder and Moenaert (1992) compare R&D and marketing at the department level of an organisation. MNC knowledge transfer and HRM literature, however, has not taken an interest in the comparison of these two functions at the subsidiary level. Apart from the comparison, the marketing function has hardly been investigated in MNC knowledge transfer between the parent company and its subsidiaries (Schlegelmilch and Chini, 2003).

There is a question regarding why R&D and marketing subsidiaries should be compared in an MNC knowledge transfer and HRM study. This is because these types of subsidiaries have different work structures based on knowledge nature. HRM must be set flexibly to support distinctive work structures and outcomes effectively. Most empirical studies on MNC knowledge transfer focus on technology-related knowledge flows rather than market-related knowledge flows (Kurokawa et al., 2007). MNC HRM topics have been explored mainly to contribute to the technology-related knowledge process. Managerial settings required for the market-related knowledge process thereby have been overlooked relatively. Some MNC knowledge transfer and HRM studies deal with local R&D networks in relation to local embeddedness (Lam, 2003) or absorptive capacity (Minbaeva et al., 2003). In the respect of local knowledge networks, the knowledge processes of marketing subsidiaries as well as R&D subsidiaries are affected by the networks (Schlegelmilch and Chini, 2003). To figure out appropriate HRM for these different knowledge processes, distinctive subsidiary work structures and team relationships for R&D and marketing projects must be compared.

Regarding how R&D and marketing subsidiaries are organised, the traditional design of multinational organisations is introduced in Lasserre (2007). The functional design in Figure 2.1 shows that R&D and marketing functions organise foreign subsidiaries similarly. However, high performance MNCs ranked in Fortune Global 500 normally have a mixed form of above functional and geographical designs. Firstly, foreign

R&D and marketing functions are not located in the same subsidiary of high performance MNCs. R&D and marketing functions are vigorously separated as different subsidiaries. Secondly, marketing subsidiaries are specifically organised under the control of the regional headquarters. In the case of R&D subsidiaries, their budgetary right is sometimes managed by the regional HQ, but they do not directly belong to the regional HQ. They mostly have a close relationship with the corporate HQ rather than the regional HQ.

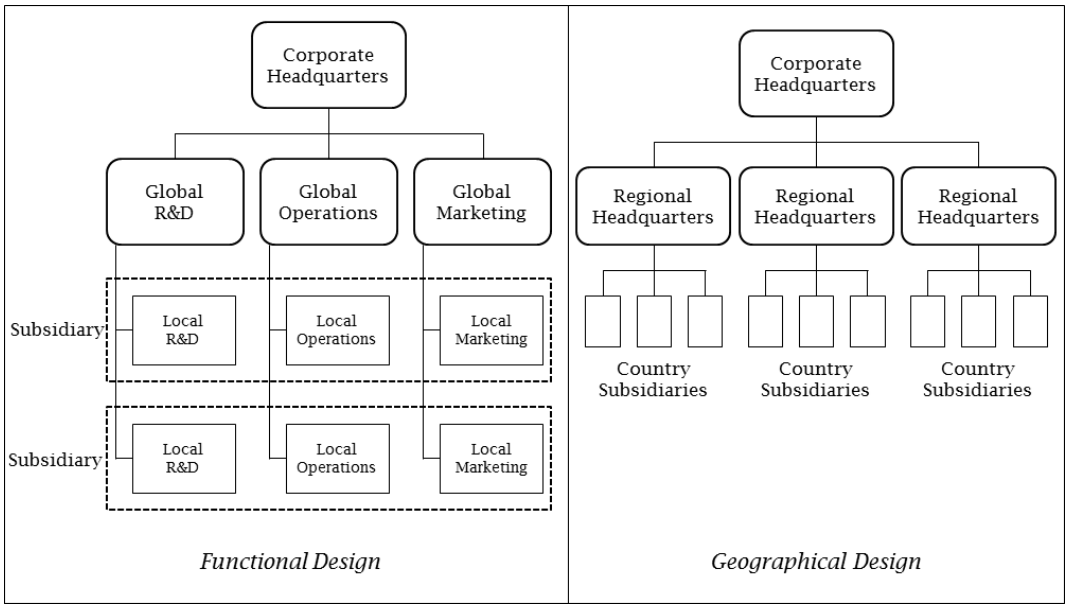


Figure 2.2. The Traditional Design of Multinational Organisations (Lasserre, 2007)

The actual structures of R&D and marketing functions are seen in Figure 2.2. The reason why these figures are reviewed is relevant to the necessity of investigating cross-national structure and local team

relationships together in an MNC knowledge transfer study. R&D subsidiaries directly communicate with the parent company, whereas marketing subsidiaries indirectly communicate with the parent company via the regional HQ. These different control structures can result in different features in local learning and the features can influence knowledge transfer as well. My research focuses on the comparison of R&D and marketing subsidiaries to look into knowledge-specific HRM settings based on different functional knowledge for effective knowledge processes. R&D and marketing functions are expected to bring about particular local team relationships and cross-national structures that affect the formation of distinctive HRM bundles.

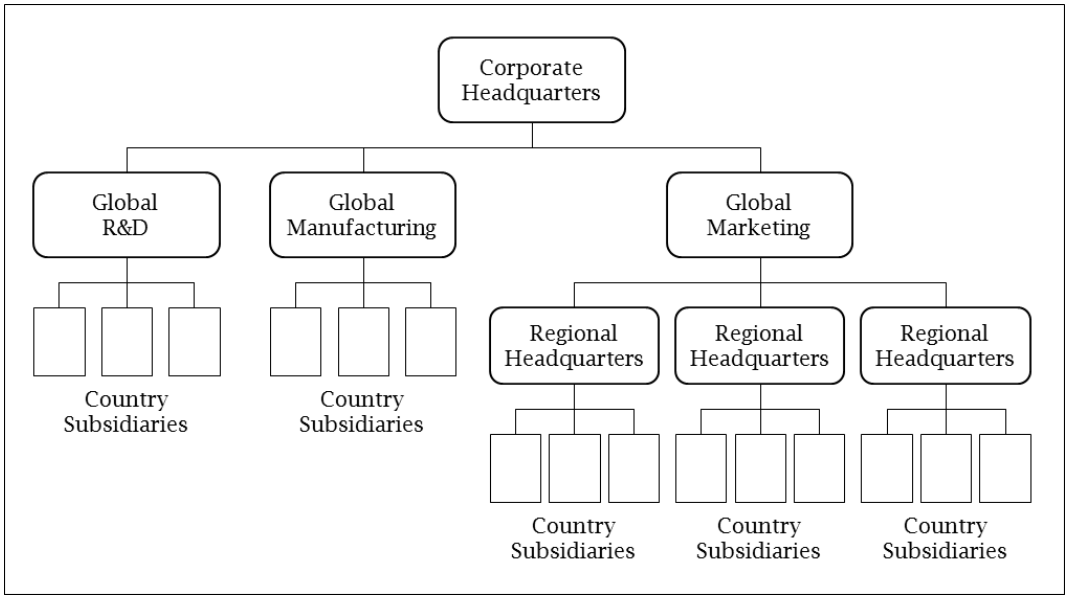


Figure 2.3. The Organisational Design of High Performance MNCs in ICT and Automotive Industries

2.5 Tacit-Explicit Features in the Knowledge Creation Process

Lam (2003) views MNCs as unique knowledge creating organisations in addressing scientific research and drug development activities to transnational social spaces for learning. Exchange activities between internal research staffs and external universities are explored in the research. As a result, the study presents differences between the professional community model of American MNCs and the organisational community model of Japanese MNCs. These models reasonably reveal how knowledge is transferred from external R&D institutions and what HRM strategies are in them. However, there is no consideration of how knowledge is uniquely created between the pharmaceutical and ICT industry as well as the US and Japanese MNCs. Missing knowledge creation brings about a gap in examining the links between the creation and transfer of knowledge. Lam (2003) does not review how MNC subsidiaries create new knowledge with external institutions for transfer. HRM objectives are to support internal work processes. Therefore, investigating how subsidiary teams work with external knowledge providers in a specific project rather than how much a subsidiary is close to the external knowledge pool can be more important to set HRM strategies.

Hocking et al. (2007), Minbaeva (2007), and Minbaeva et al. (2003) also discuss the local learning of foreign subsidiaries in relation to MNC knowledge transfer. They differently explore activities by knowledge agents such as expatriates, knowledge senders, and knowledge receivers.

Although this is a necessary approach for investigating the behavioural activities of employees, those agents are just considered as the medium of knowledge transfer without considering what conditions influence knowledge creation. The study of Nonaka et al. (2000) reveals that tacit knowledge and explicit knowledge are complementary in knowledge creation. Knowledge nature created in local team relationships can be explored with tacit and explicit features. This knowledge nature is important because it can affect knowledge transfer and HRM configurations. To review knowledge nature in tacit and explicit exchanges, the relationships of team members in knowledge creation must be reviewed. How these tacit and explicit attributes are distinctively interacted in R&D and marketing can be investigated when the local team relationships in the knowledge creation process are reviewed.

Previous studies mentioned above surely do not intend exploring actual descriptions of micro knowledge generation practices. My research does not aim to do so either, but more focus on local team relationships in the knowledge creation process is important for HRM settings. To satisfy curiosity about those issues, my research can start from the circulated stages of knowledge development in the link of tacit and explicit knowledge suggested by Nonaka (1994). There are four different stages: 'socialization', 'externalization', 'combination', and 'internalization' that mean 'tacit to tacit', 'tacit to explicit', 'explicit to explicit', and 'explicit to tacit' knowledge. When this model is applied practically, the explicit and tacit figures of knowledge can coexist in

Japanese or US MNCs because even scientific knowledge can be initiated from tacit ideas. Those four processes occur within an organisation but two organisations can also have overlapped parts through collaboration. An important point is that this research explores team relationships, task interdependence, and knowledge complexity that imply relationships between tacit and explicit knowledge.

2.6 Knowledge Transfer and Subsidiary Control

Managing foreign subsidiaries is closely related to the success of MNC knowledge transfer (Björkman et al., 2004). One of critical knowledge contexts is to link a parent company to other subsidiaries (Almeida and Phene, 2004). My focus is on what aspects in relationships between MNC subsidiaries and HQ promote knowledge transfer, comparing knowledge transfer in different functional subsidiaries. It is inevitably connected to structural mechanisms that configure technological and non-technological knowledge processes. Relationships between MNC foreign subsidiaries and HQ in the knowledge transfer process are thus worthy of investigation. These subsidiary-HQ relationships have been studied in some different perspectives. Subsidiary-HQ relationships are sometimes reviewed as bargaining relations for maximizing knowledge sharing in the view of agency theory (Mudambi and Navarra, 2004). The relationships are investigated in how to design an incentive structures for subsidiary managers (Gupta and Govindarajan, 2000). Such a view based on agency theory regards foreign

subsidiaries as agents that cause costs. In contrast, knowledge perspectives based on socialization theory regard MNC subsidiaries as objects for integration.

Coordinative control mechanisms employ those two perspectives (Cray, 1984). Power relations between HQ and subsidiaries have been considered as a popular topic in particular. Corporate control over subsidiaries in their relations is preferentially reviewed with knowledge flow patterns (Gupta and Govindarajan, 1991). As a result, coordinative autonomy for such subsidiary control can be important for MNCs to actualize effectiveness in knowledge transfer. Many studies regarding what MNCs watch carefully toward foreign subsidiaries already treat the concept, subsidiary autonomy. In particular, there are four types of operational managers in foreign subsidiaries: free agents, local managers, expatriate managers, and dual nationals (Mudambi and Navarra, 2004). The distinctions between them can be measured through the degree of their loyalty to an MNC parent and its local subsidiary. For instance, an expatriate manager is dispatched to reduce local autonomy and this type of operational managers shows loyalty to HQ rather than the subsidiary. How much autonomy MNC subsidiaries have for local operation is the main interest here.

MNC management types for foreign subsidiaries have been studied particularly in the relationships between MNC subsidiaries and HQ. Lam (2003) reveals that US MNCs try to create globally integrated networks of R&D coordinated by project management with a considerable

degree of autonomy of the local R&D organisations. On the other hand, the global R&D structure of Japanese MNCs is in a HQ-centred hub model with tight control over the local R&D units. Two terms, coordinated autonomy and participative centralization, reveals these characteristics. Previous studies that explore centralized and decentralized authority also reflect the autonomy degree. The degree of autonomy has been reviewed as a tool to control foreign subsidiaries in some other terms such as delegation, empowerment, and discretion (Baliga and Jaeger, 1984; Edwards and Collinson, 2002; Ferner et al., 2004; Ferner et al., 2011).

However, these studies do not consider what ranges of working processes require autonomy in local operation. My question is where the autonomy is placed in the operational parts of foreign subsidiaries. Coordinative mechanisms to reflect this issue and managerial strategy based on them must be studied (Martinez and Jarillo, 1991). Kostova and Roth (2002) reveal that foreign subsidiaries adopt HQ practices differently under pressure from their parent company. Their adoption model may show autonomy types granted to subsidiaries, but it is a top-down mechanism. I am interested in the more bottom–up process of how knowledge gets created and transferred from subsidiaries. As a result, my focus is particularly on what MNCs let foreign subsidiaries have different types of autonomy for and how different types of autonomy are granted to subsidiaries. Such a coordinative mechanism is closely linked to the local embeddedness of foreign subsidiaries, their dependence onto HQ, knowledge transfer methods, and local autonomy in decision-making.

2.7 MNC HRM and Contexts in Configurational Perspectives

Many studies have dealt with relations between HRM practices and organisational performance such as financial outcomes, job satisfaction, and organisational commitment. Purcell and Hutchinson (2007) present an HRM-performance model that indicates a causal flow from HRM practices to outcomes in firms. It shows that perceived HRM practices result in financial or economic outcomes through impacts on the attitudes and behaviour of employees. At this point, employee attitudes and behaviour are viewed as employee reactions, which bring about employee responses accompanied with subsequent behaviour. Employees can develop target resources to achieve an organisational goal in such behavioural reactions while utilizing existing resources. Nevertheless, events in the above HRM-performance model do not necessarily reflect the interaction of human resources with other firm resources because it only examines human resources. Human resources obtain anticipated outcomes through creating other resources as well as using them. In particular, employees in knowledge-intensive companies are supposed to plunge into innovative knowledge resources to produce organisational performance. Knowledge resources thus become important outputs of human resources to be able to be connected with organisational outcomes. The HRM-performance causal chain (HPCC), as a result, becomes clearer when the hidden flow of firm resources is considered.

At the same time, the HPCC requires the consideration of what part HRM plays for the causal results related to behavioural reactions and outcomes. Rucci (2009) states that motivating people to build organisational capabilities for sustained value creation is the role of HRM. HRM can work in the reinforcement theory as a behavioural modification way to shape learning behaviour by arousing motivation. Robbins (2005) says that positive reinforcement is a powerful means to change behaviour and more effective than punishment in learning activities. In the HPCC of knowledge-intensive firms, HRM encourages employees to build learning capabilities in behavioural reactions and then valuable knowledge is created within accumulated learning capabilities. This relation between knowledge creation and HRM is not limited to the knowledge-intensive industry. Even in other industries, knowledge resources are likely to be inseparable from human resources. Hislop (2005) reveals that there are linkages between knowledge management, HRM, and business strategies across industries. People individually form original ideas that can possibly create economic value in the near future. HRM practices will encourage them to initiate creative actions to produce new knowledge from their ideas. Then the knowledge can be developed eventually as a form of intellectual property in the wide range of business. According to Hansen et al. (1999), HRM motivates employees to make knowledge explicit and training as one of HRM practices develops skills in organisations. This fact shows that HRM practices help employees share their own tacit knowledge in the common business environment while

improving organisational capabilities for knowledge creation and transfer. Therefore, HRM practices shape the development process of learning capabilities and knowledge resources in order to gain organisational outcomes. Behavioural reactions to HRM practices promote this process through positive attitude and active participation in knowledge generation.

In particular, absorptive capacity has been explored as the core of learning capabilities for knowledge transfer. New knowledge from external sources is understood and used differently according to the absorptive capacity of organisational units (Cohen and Levinthal, 1990). Multinational corporations can achieve innovations by managing absorptive capacity that dominates knowledge transfer processes (Tsai, 2001). However, most previous studies focus on the positive relations between absorptive capacity and knowledge transfer. Social cohesion, path dependencies, and knowledge tacitness have been treated as the key mediating factors of those relations (Reagans and McEvily, 2003; Bierly III et al., 2009; Lichtenthaler and Lichtenthaler, 2010). These mediators influence the use of absorptive capacity rather than the formation of it. There is a curiosity regarding what can shape absorptive capacity in knowledge transfer. How HRM practices promote the ability and motivation of MNC subsidiary employees in the relationships with the HQ or external networks must be reviewed.

Such HRM practices have typical forms that are widely applicable to organisations even though people use them in different

ways. The research of Stiles et al. (2006) classifies international HRM practices into three principal domains: talent management, performance management, and reward management. General HRM practices such as recruitment, selection, training, goal setting, appraisal, and rewards constitute those three domains. However, including this research, many studies in international HRM do not deal with issues of 'working conditions' and 'diversity'. Many organisations are recently challenged in attracting talented people that have diverse backgrounds (Millmore et al., 2007). At this point, cultural and environmental issues in the workplace can be important matters for managing employees. The study of Cavusgil et al. (2008) reveals that diverse employees provide a wealth of experience and knowledge for firms when they are well managed in a favourable environment. As a necessary consequence, HRM practices in the global environment can be reorganised for research: 'recruitment and staffing', 'training and development', 'planning and appraisal', 'compensation and benefits', and 'managing working conditions and diversity'.

These practices, however, might be applied differently to learning sites in terms of HRM systems. The concept of the 'HRM system' is important in inquiring into the HRM practices of organisations. They can be accompanied with particular combinations according to the organisational environment. Bowen and Ostroff (2004) mention that the HRM system as the specific sets of HRM practices can be employed to accomplish organisational goals. At this time, it is important to

understand the sets of HRM practices in contexts. There is a reason why context should be considered when HRM systems are explored in organisations. Systems theory has often been mentioned in organisational studies in conjunction with environmental impact. According to that, organisations are open systems that interact with their environment as parts of social systems. This fact means that the outputs of organisations can become different depending on environmental conditions even though their inputs are the same. For this reason, understanding various contexts prevents a false idea of organisational relationships in the HPCC so that organisations can know what they must do to survive environmental changes. HRM in the open system, therefore, explains exchanges with the surrounding environment in the causal chain from practices to outcomes. Both internal and external environments should be considered for HRM research at this point.

Truss (2001) says that the impact of the external environment on HRM should not be underrated even if the results of HRM practices in firms hang upon their organisational context. Fleetwood and Hesketh (2006) also argue that information on the internal and external environment of organisations can increase the explanatory power of management research. About this matter, the concepts of the HRM best fits and the HRM best practices are important. The best HRM practices linked to MNC performance have been identified in many studies (Wright et al., 2005a). However, these HRM practices can be more efficient when they are linked to their organisational environment (Stavrou et al., 2010).

The main focus of the HRM best fit has been a linkage with organisational strategy based on competitive advantage (Fombrun et al., 1984; Schuler and Jackson, 1987; Wright and McMahan, 1992). HRM-performance links affected by geographical contexts have also been explored (Stavrou et al., 2010). My research contributes to the best fit perspective of HRM in linking the particular sets of HRM practices to different contexts of R&D and marketing.

2.8 Identification of Research Gaps

The topic of HRM and knowledge transfer has been explored through many studies as seen in Table 2.1. Among them, my research deals with how HRM systems are configured in different subsidiaries, similarly to Lam (2003). The marketing function as well as the R&D function is highly dependent on knowledge transfer between subsidiaries and the parent company (Schlegelmilch and Chini, 2003). Nevertheless, these two functions have not been compared in my research field. Most research on knowledge creation has addressed the generics of the process such as how knowledge is identified and systematized. It has not asked how far the process differs between functions. Similarly, research on transfer has addressed aspects of MNCs that facilitate knowledge transfer, and not differences between functions. My research shows how and why the context of the specific function matters to these two processes.

Research Focus	Previous Studies
Potential mechanisms and processes	(General Management) Grandori

facilitating knowledge transfer in multinational companies	and Kogut, 2002; Grant, 1996; Jansen et al., 2005; McEvily et al., 2004; Nickerson and Zenger, 2004; Osterloh and Frey, 2000 (HRM) Björkman et al., 2004; Hocking et al., 2007; Gupta and Govindarajan, 1991; Mahnke et al., 2005; Vance et al., 2009; Vance and Paik, 2005
How different/specific HRM practices facilitate organisational knowledge transfer	Cabrera and Cabrera, 2005; Foss, 2007
How HRM practices may be used to increase absorptive capacity or to overcome other knowledge transfer barriers	Minbaeva, 2005; Minbaeva et al, 2003 (ideal set universally used)
How HRM systems are configured in different subsidiaries	*Lam, 2003*
How HRM settings affect knowledge stocks and flows between different employee groups	Kang et al, 2007; Lepak and Snell, 2002; 1999

Table 2.1 The Research Field Focused On

In sum, previous studies have weaknesses in the limited exploration of knowledge creation processes in the knowledge transfer studies of MNCs, in the insufficient discussion of what roles and discretion MNC subsidiaries take, and in the limited explanation of how HRM supports knowledge processes across learning sites. In reviewing these issues, this research addresses some research gaps in three main areas. The first one is insufficient understanding of tacit and explicit relationships in the knowledge creation process. There is limited explanation of what the balance is between tacit and explicit knowledge in the process. The second gap is the limited discussion of the role and autonomy of MNC subsidiaries. An important question is what types of

autonomy are presented in foreign subsidiaries and what they do in the knowledge transfer process. The final gap is the insufficient explanation of linking HRM to different types of foreign subsidiaries. It causes a need for exploring how to pattern HRM activities in different contexts. The key is to develop a reasonable comparative frame across learning sites and reflect their different contexts in the HRM strategy to manage foreign subsidiaries.

A point to take is that there are two kinds of learning, individual learning and organisational learning, in organisations (Fiol and Lyles, 1985; Dixon, 1994). Therefore, the distinctions of learning capabilities can be made between individual and organisational aspects. The study of Yeung et al. (1999) indicates that the organisational learning capability is the capacity for generating and generalizing new knowledge that has a beneficial effect on organisations. On the other hand, the individual learning capability can be viewed in the tacit aspects of learning (Dixon, 1994). This fact means that it is not easy for the individual learning capability to be transmitted from a person to another person. For this reason, organisational learning capabilities do not reflect all individual learning capabilities even though they are likely to result from individual learning capabilities. The different needs of these learning capabilities may be associated with collectivistic activities in work groups. However, my research does not intend to explore the effect of collectivism itself or the relation between individual capabilities and collectivistic capabilities. It shows interest in what kind of learning capabilities different learning

sites more focus on. They can help the understanding of causal factors that shape individual and group work structures.

Previous studies reviewed in this chapter contribute on identifying research gaps and where my research should focus on. Some other studies are reviewed in empirical chapters in order to build theoretical frameworks and hypotheses. In particular, theoretical perspectives of knowledge complexity and weak ties, MNC control structures in knowledge transfer, and the configurational fit of MNC HRM are additionally reviewed in these chapters.

2.9 Concluding Comments

Lam (2000, 2003) provided inspiration for this PhD research and there were some critical points to initiate new research. Some gaps were caused by the focus on R&D, the neglect of knowledge creation, the insufficient understanding of tacit and explicit relationships, veiled areas in exploring how to pattern HRM activities in different contexts, and the insufficient understanding of causal factors that shape individual and group work structures. On the basis of research gaps, three groups of unsolved questions were addressed as well. Organisational configuration theory supports the investigation of those issues. Effective organisational structures and managing methods will be affected by contextual factors such as work environment in this theoretical background. Environmental complexity, organisational strategy, technological contexts, and organisation size can be critical factors (Bums and Stalker, 1961;

Chandler, 1962; Child, 1972; Hickson et al., 1969; Lawrence and Lorsch, 1967; Thompson, 1967; Woodward, 1965). Different contexts of R&D and marketing are considered so that how organisational work structures are linked to them can be examined.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This research is comparative between functions and sectors, and it is based on qualitative and quantitative data. In recollecting literature review, research fieldwork needed relevant empirical data to clarify three main concerns: tacit and explicit knowledge nature in the knowledge creation process, the role and autonomy of MNC subsidiaries in knowledge transfer, and linking HRM to the different contexts of foreign subsidiaries. A survey questionnaire and interview questions were constructed in taking measurement items from previous studies related to those three topics. These developed through pilot testing and exploratory interviews. At this stage, measured variables are provided for multi-way multivariate analysis of covariance (MANCOVA) and qualitative analytic induction. Exploratory interviews, a questionnaire survey, and follow-up interviews were performed in turn to collect data. MNC subsidiaries located in the UK and the US which are selected from 2010 Fortune Global 500 are explored. This chapter reveals methodological rationales of why my research employs particular approaches to collect and analyse empirical data.

3.2 Methodological Development

3.2.1 Research Aim

This research explores team relationships and HRM settings that affect the process in which R&D researchers and marketers deal with new knowledge as a project outcome. The main focus is on comparison between different subsidiaries in dealing with experiences and opinions of host country employees regarding MNC project knowledge that they have created and transferred from a subsidiary to its headquarters. To investigate the process of MNCs, researchers in foreign R&D centres and marketers in foreign business corporations are studied. Exploratory interviews, a questionnaire survey, and follow-up interviews are conducted in turn. Two types of interviews are employed at this time: individual interviews with employees at the managerial level and group interviews with employees at the lower practical level. The R&D centre and the business corporation exist as separate foreign organisations in each MNC to be observed independently. R&D researchers and marketers in their headquarters are also studied so that the experiences and opinions of a subsidiary and its parent company can be compared.

Empirical data are collected and classified into three parts through those quantitative and qualitative methods. They are local knowledge creation, transnational knowledge transfer, and the configurational fit of HRM. At this time, the research focus is on local team relationships, cross-national control structures, and work contexts that set HRM. Research fieldwork thus needs some important actions:

understanding team structures in transnational MNC projects, investigating internal and external relationships in projects, identifying project outcomes to view knowledge resources created and transferred, discovering work processes for successful project outcomes, exploring HRM settings and environmental factors influential in carrying out projects, and reasoning causal factors in comparing different functions and sectors.

3.2.2 Research Questions

As mentioned in the literature review, existing research has weaknesses in the limited exploration of knowledge creation processes in the knowledge transfer studies of MNCs, in the insufficient discussion of what roles and discretion MNC subsidiaries take, and in the limited explanation of how HRM supports knowledge processes across learning sites. The importance is that they result from the insufficient understanding of tacit and explicit relationships caused by the focus on R&D, veiled relations between transnational co-work and subsidiary control, and limited investigation in exploring how team relationships based on knowledge features shape different work contexts and HRM. Through reviewing these issues, my research addresses three groups of unsolved questions in the next paragraph. Research hypotheses constructed on the basis of these research questions and identified variables are introduced in each empirical chapter afterwards.

The first research question is what the balance between tacit and explicit knowledge nature is and how local relationships are shaped in the knowledge creation process. My research aims to focus more on the local creation process connected to knowledge transfer and investigate the distinctive conditions to produce tacit and explicit knowledge nature. The second one is what conditions configure transnational relationships in the knowledge transfer process and how they affect subsidiary roles across different learning sites. A focus is on comparing sites other than R&D in transnational learning cases and reviewing the control structure of MNCs. Finally, how those local and transnational relational matters are reflected in HRM settings of MNCs and how HRM can promote the knowledge process in different learning sites is questioned. The main focus is on how HRM activities are patterned according to knowledge nature and different work structures.

3.3 Research Model

3.3.1 Conceptual Framework

The viability of MNCs is signified by developing and transferring knowledge more effectively and efficiently in the complicated global environment (Gupta and Govindarajan, 2000). There is a pending question on how MNCs actualize effectiveness or efficiency in knowledge generation in the global work environment. The answer can come from two fundamental knowledge contexts that enclose MNCs: the local environment of host subsidiaries and linking the headquarters to other

subsidiaries (Almeida and Phene, 2004). Local networks and embeddedness have been popular in research for the former, while subsidiary control and coordination have been researched a great deal for the latter. Exploratory interviews can give shape to these topics in order to provide concrete 'explained' variables' for 'explanatory' variables of R&D or marketing and ICT or automotive.

Local team relationships including knowledge creation activities introduced by Nonaka (1994) and relationships with external networks are thus a starting point for effectiveness and efficiency in knowledge transfer. After exploratory interviews, my research specifies these local team relationships as value creation through socialization and IT Tools, knowledge figuration through externalization and combination, and team interdependence and leader-member relations. Then transnational team relationships including how a parent company manages foreign subsidiaries become another point for the knowledge-procedural effectiveness and efficiency. These cross-national relationships are specified as local embeddedness of foreign subsidiaries, information dependence and expatriation, and subsidiary autonomy in knowledge transfer through exploratory interviews.

High performance work practices (HPWP) construct the other group of variables. They are also employed to reveal what set of practices are formed in different groups. As a result, how differences in those relationships link to difference in HRM can be observed as a result. Organisational contextual factors such as team size and work style are

controlled as covariate variables at this point. Figure 3.1 is a conceptual research framework, which outlines research variables and hypotheses in this empirical research. Concepts have been reviewed in previous paragraphs and literature reviews to support methodological approaches for research questions. As seen in the figure, empirical chapters mainly test hypotheses from dependent variables of local team relationships, cross-national control structures, and HRM linked to independent categorical variables. Their statistical differences are tested in multivariate MANCOVA and then more explored through analytic induction from follow-up interview data. Relevant 'explanatory', 'explained', and 'control' variables are explained more in the next section.

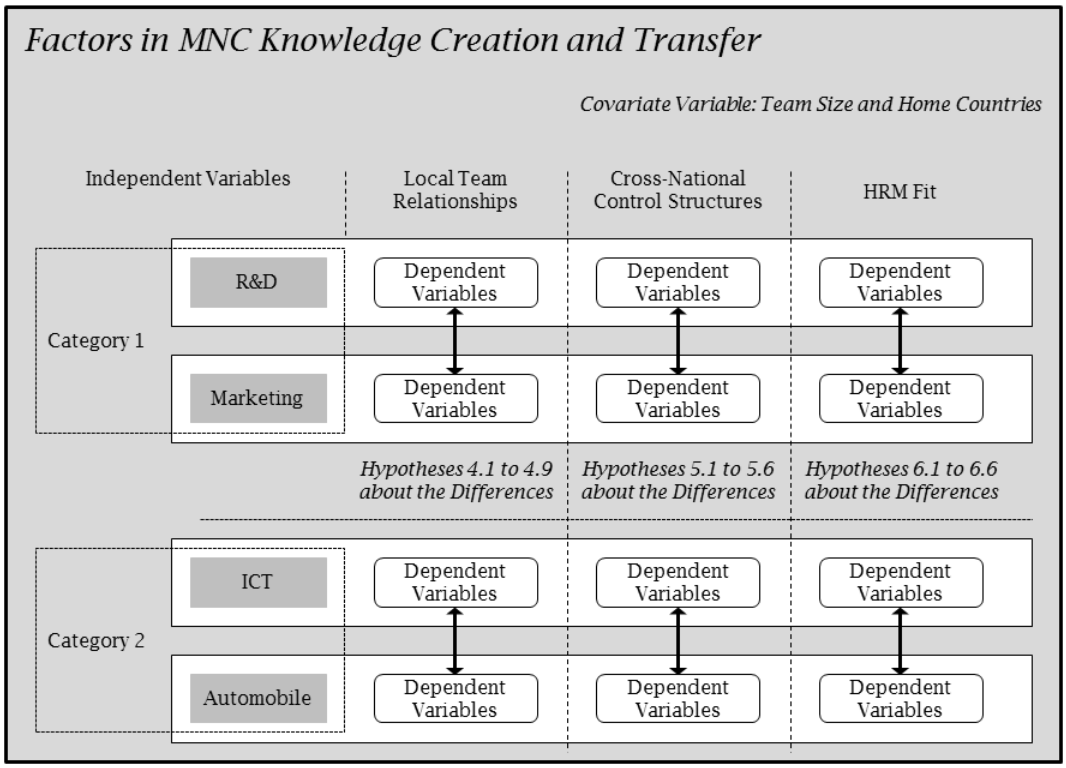


Figure 3.1. Research Framework, Variables, and Hypotheses

3.3.2 Explanatory and Explained Variables

Explanatory variables as independent variables consist of R&D-marketing and ICT-automobile. The marketing function as well as the R&D function is highly dependent on knowledge transfer between subsidiaries and the parent company (Schlegelmilch and Chini, 2003). Nevertheless, these two functions have not been compared in my research field. For this reason, the function is most important as an independent categorical variable in this research. ICT and automotive sectors are selected because these industries are knowledge-intensive. The effect of sectors on local and cross-national knowledge features is tested as well. The country of origin is not my main interest because a research gap is not identified in relation to this factor. However, my research results are expected to confirm the findings of Lam (2003) or add a new finding.

On the sector, the purpose is to see whether R&D-marketing differences are general, that is common across sectors, washed out by sector differences, or contingent. My findings mainly indicate that there are general differences but these can sometimes take a different form in the context of sectors. Therefore, context matters, and this contingency is explained through Table 4.10 and 5.10. Team size, the project period, and the project cost are factors that create a different form in the context of sectors. On the country of origin, my research had no reason to expect that knowledge creation processes will vary systematically according to this influence. Nonetheless, my research controlled for it where relevant

but did not set out to test it. If relationships hold when it is controlled for, the arguments in respect of the role of functions and sectors are strengthened. The effect of home country is summarized in the discussion section of each chapter, which reveals the main places where home country has an effect and how this research thinks that this result can be interpreted.

Explained variables construct dependent variables with some measurement items for each. They are described in the following Table 3.1 and measurement items for each variable are shown in a survey questionnaire attached in the appendix. Explained variables and measurement items are built from previous studies but some are added or polished up from explanatory interviews. Measurement items are introduced briefly here, but the details are described in each empirical chapter and the survey questionnaire attached. Socialization activities have been tested in a lot of previous studies and most of them, which are statistically significant, are included as measurement items. Different information sources of a supplier, a corporate buyer, end-customers, an agency, an academic institution, and another subsidiary are tested to clarify types of external information used in a project. Knowledge transfer methods consist of expatriates, international working groups, and international assignments, which have all been treated popularly in previous studies.

The main hypothesis for HRM is that marketing and R&D of MNCs reveal different configurations of HRM practices. This is examined

in five functions of HRM employing several HPWP practices identified in relevant literature as measurement items. They are expected to form new classification on the basis of causal conditions. How HRM practices are grouped and what features each group has are explored for this. The causal relationships between research variables are not final objectives that this research pursues. Further causal factors need to be unveiled by additional qualitative analysis from follow-up interviews.

Explained Variables	Measurement Items	Ch.
Team Socializing	- Socialization activities - Using IT as a communication tool - Using IT as a database	4
Work Reporting Types	- Presenting knowledge through written reports - Presenting knowledge through verbaliza -tion or any other collaboration tools	
External Partner Types	- 6 providers of external information used in a project: suppliers, buyers, agencies, academic institutions, other subsidiaries, and other local partners	
Task Interdependence	- Distinction between preceding and succeeding roles	
Leadership Styles	- Team leaders' attention to members in dealing with disagreement in a project	
Information Dependence	- Informational dependence on HQ	5
Informational Support of the Locals	- Geographic proximity of local networks	
Knowledge Sharing Frequency	- Online and offline meetings (knowledge sharing frequency) with HQ	
Expatriation	- Knowledge transfer methods (types)	
Subsidiary Autonomy in Knowledge Transfer	- Decision control by HQ over planning local strategies - Decision control by HQ over planning local resources (HR and finance)	
HRM Practices	- Recruitment and staffing - Training and development - Planning and appraisal - Compensation and benefits - Managing working conditions	6
Organisational Conditions	- Team size - Home countries	4,5,& 6

- Sources for Measurement Items

Chapter 4 Variables:
Almeida and Phene (2004); Barney (2002, 1991); Carlile (2002); Eriksson et al. (1997); Gourlay (2006); Hall (1992); Hansen (1999); Kogut and Zander (1992); Nonaka (1994); Nonaka and Takeuchi (1995); Rynes et al. (2001); Schulz (2001); Simonin (1999a, 1999b);

Subramaniam and Venkatraman (2001) *Chapter 5 Variables:* Baliga and Jaeger (1984); Chini and Ambos (2006); Cummings (2004); Edwards and Collinson (2002); Edwards et al. (2002); Ferner et al. (2011, 2004); Hocking et al. (2007); Johnston (2005); Kamoche (1997); Lam (2003, 2000); Meyer et al. (2011); Miner (2006); Thompson (1967) *Chapter 6 Variables:* Becker and Gerhart (1996); Bowen and Ostroff (2004); Boxall and Macky (2007); Cohen and Levinthal (1990); Kraimer and Wayne (2004); Lepak and Snell (2003); Minbaeva et al. (2003); Sessa and London (2006); Teigland and Wasko (2003); Zheng et al. (2006); Wageman (1995)

Table 3.1. Explained Variables and Sources

3.4 Combination of Qualitative and Quantitative Approaches

3.4.1 Interview and Survey Design in Triangulation

Uncertainty in the interpretation can be reduced when a proposition is confirmed by two or more independent measurement processes (Webb et al., 1966). Based on this idea, my research makes progress in combining qualitative and quantitative investigations to increase the validity of results as drawn in Figure 3.2. Exploratory interviews are initially performed to specify research variables for a questionnaire survey and follow-up interviews. Interview questions are semi-structured but a little more opened for extensive opinions. A pilot test is performed to evaluate the competency of the survey questionnaire at the same time. The pilot test and exploratory interviews are intended for middle and lower level employees in MNC R&D centres and business corporations. The next stage's self-completion questionnaire survey with a few open-ended questions is intended for R&D researchers and marketers through random sampling within target groups. When a preliminary analysis using a part of survey responses is completed,

follow-up interviews with some of the survey respondents are performed to clarify causal conditions for new findings. Qualitative and quantitative data supplement each other in reasoning causal relationships at this time.

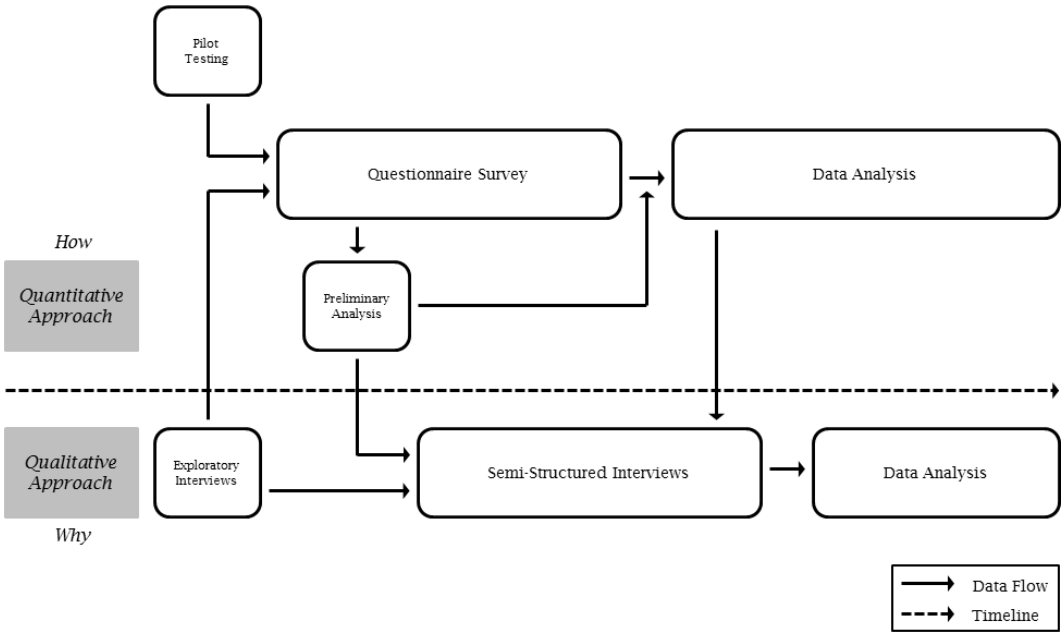


Figure 3.2 Qualitative and Quantitative Data Managing Process

3.4.2 Ontological and Epistemological Stance in Methodology

The triangulation approach may bring about dissonance in research philosophy. The use of quantitative and qualitative approaches in combination can result in better research across social science, providing a better understanding of research problems than either approach alone (Creswell and Plano-Clark, 2006). However, research design using two different research methods can cause a crash between the ontological and epistemological position. This philosophical discrepancy is resolved by two parts of ontological realism and

epistemological relativism in critical realism, whereby research can add rationality to itself. While empirical realists believe in epistemological realism, critical realists think that people cannot be objective epistemologically because they are critical of people's ability in knowing reality.

There are three fundamental principles of critical realism: ontological realism, epistemological relativism, and judgmental rationality (Bhaskar, 1975). They indicate that reality exists independently of perceived knowledge, the knowledge is socially constructed, and rational criteria based on the relative explanatory power exist for the choice between different theories. Bhaskar (1975) states that there are the transitive dimension related to epistemological relativism and the intransitive dimension linked to ontological realism in the social science world. When patterns of events at the actual level are newly produced by generative mechanisms of the real domain, people recognize a part of them in the empirical world. Then they can try to analyse and interpret the real dimension from the empirical dimension in transitive discovery activities. Developing theories or theoretical systems in research can also be viewed in the same way. In other words, the main purpose of social scientific theory is to provide explanation for hidden generative mechanisms named social structures.

Critical realism offers a better alternative because it overcomes ontological ambiguity that results from the social world viewed with different perspectives of social groups in postmodernism (Fleetwood,

2005). Reality cannot be determined simply by human language if people recognize that they cannot be aware of everything. Nevertheless, our perception can be close to it by providing the selective arrangement of theories or concepts for a better understanding (Modell, 2007). At this point, pragmatism may be an alternative choice to provide philosophical ground for mixed methods of research. There is a pragmatic-critical realist position that admits the possibility of something beyond language (Johnson and Duberley 2000). However, reality is considered as a construction of thought in terms of apperception (Durkheim, 1983). Although pragmatic-critical realism may look similar to critical realism, it tends to make light of problems that come from ontological relativism. This fact means that the use of a meta-theoretical approach, which gets something more fundamental from related concepts or theories, is apt to be limited in pragmatism.

As a result, critical realism becomes more appropriate for my research project that tries to inductively find more causal factors in limited recognition and specified context as well as relationships between independent and dependent variables. My research may seem to take a positivistic stance because it advocates the use of quantitative methods to identify causal relationships. It is true that reality exists; however, my research assumes that causal relationships are limitedly perceived and confirmed. Because of the limitation of perception by intervening processes, causes may or may not operate, and their effects depend on context. This issue is more explained with some causal factors at the end

of Section 7.3. Research findings are still significant because all factors cannot be controlled in social studies.

3.5 Data Collection

3.5.1 Interviews

My research fieldwork for qualitative data was designed to explore the foreign R&D and marketing subsidiaries of 4 Korean MNCs. These companies were deserved to be studied for they were ranked in the top 80 companies of 2010 Fortune Global 500. Organisations located in the UK were preferably investigated, but three of those companies did not have their R&D centres in the country. For this reason, my research considered where subsidiaries were located and which countries had similar features. The country characteristics of the UK and the US are not much different in cultural proximity (Lam, 2003). Therefore, the US R&D centres were selected taking the similar cultural and communicative features of two countries into consideration. This fact means that the impact of home and local environments is controlled in order to look into the effect of industrial and functional variations. ICT and automobile industries were expected to represent the knowledge-intensive industry with plentiful R&D and marketing projects.

Four R&D and four marketing subsidiaries in the UK and the US have been explored as depicted in Figure 3.3. Lam (2003) looks over the differences of knowledge sourcing according to firm-origin, whereas my research is distinguished from her study in the variations of industrial

sectors and functional units. A point to see is that Lam (2003) has only one firm in each segment whereby it may not represent the features of the segment very well. In contrast, my research has two companies in each whereby it can improve the validity of comparisons. The effects of home countries and team size are controlled as covariates in multivariate analyses in order to observe functional and industrial effects clearly.

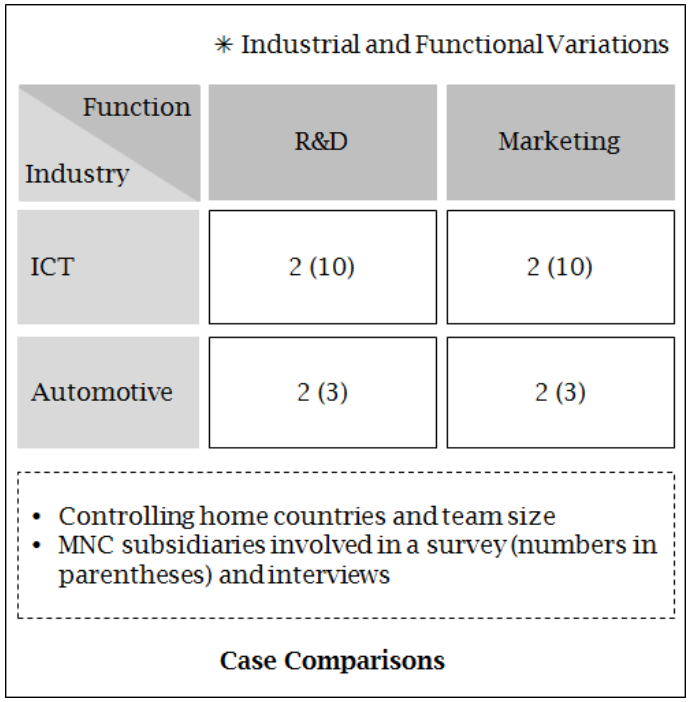


Figure 3.3 Designing Case Comparisons[5]

HQs are reviewed to balance the opinions of home and host employees as well. Biased or non-representative data may be created by one-sided view when examining knowledge transfer between two

[5] The numbers of subsidiaries involved in the questionnaire survey are indicated in brackets.

countries. Eight more R&D and marketing organisations in South Korea where HQs are located are thus observed to present a balanced view. Initial exploratory interviews were carried out between mid-November 2010 and mid-January 2011. Eight middle and lower level employees in R&D centres and business corporations located in the UK and the US were involved in these interviews. To supplement the survey results, follow-up interviews were performed using semi-structured questions and a few open questions. These interviews lasted around two hours each and were conducted from the beginning of July 2011 to the beginning of November 2011. They were intended for thirty-five practical level employees in marketing and R&D subsidiaries and in HQ sub-units as shown in Table 3.2.

Interviewees	R&D	Marketing
35 MNC employees in 8 subsidiaries (the UK and US) and 8 HQ organisations (South Korea)	MNC 1A in Korea (Suwon) MNC 1C in the US (San Jose)	MNC 1B in Korea (Seoul) MNC 1D in the UK (Chertsey)
	MNC 2A in Korea (Anyang) MNC 2C in the UK (London)	MNC 2B in Korea (Seoul) MNC 2D in the UK (Slough)
	MNC 3A in Korea (Namyang) MNC 3C in the US (Detroit)	MNC 3B in Korea (Seoul) MNC 3D in the UK (High Wycombe)
	MNC 4A in Korea (Namyang) MNC 4C in the US (LA)	MNC 4B in Korea (Seoul) MNC 4D in the UK (Weybridge)

Table 3.2. Sampling for Follow-Up Interviews

Exploratory interviews were carried out with eight R&D and marketing employees involved in pilot testing of the survey to verify the relevance and suitability of questions. Semi-structured interviews were initially designed consisting of six individual interviews with low/mid-level employees and two individual interviews with HR/strategy managers

for each subsidiary. The MNCs were uncomfortable when they were approached with this type of interviews because of the amount of interviews, the resistance towards individual interviews with low-level employees, and the amount of time to spend. For this reason, one group interview with 3-5 marketers, two individual interviews with low/mid-level employees, and two individual interviews with HR/strategy managers had to be suggested to reduce time and their feeling of refusal. As a result, 35 interviewees seen in Table 3.2 were involved in 8 group interviews with 2-3 people and 13 individual interviews. Members of each group debated how they related to each other and were encouraged to discuss the processes through which they identified and shared knowledge. My research also wanted to minimize common method bias caused by one-sided measurement by balancing the views of practical and managerial levels by interviewing HR or some other middle managers.

Interviewees in the UK and the US were mainly asked about work structures, work processes, team relationships, and conditions for success in multinational projects. On the other hand, interviews in South Korea were focused more on clarifying previous findings in the UK and the US. The topics were related to corporate strategies, subsidiary autonomy, responsibilities, competition, work cycles, geographical considerations, diversity, organisational integration, decision-making, and leadership. The semi-structured interview topics and questions are attached in the appendix.

1	*MNC 1: South Korea-based headquarters, ranks 32nd on 2010 Fortune Global 500* 1) MNC 1C located in the US: Its research focuses on computer science (next generation software concepts), wireless connectivity (wireless innovation) and storage (quietest hard drives with highest storage capacity and lowest power consumption). Although it is located in Silicon Valley, it does not have any relationship with universities. Instead, it has relationships with its suppliers. Suppliers transfer sub-technologies for technical components to MNC 1C. 2) MNC 1D located in the UK: It builds local marketing strategies such as 4Ps, STP, and sales strategy for European markets.
2	*MNC 2: South Korea-based headquarters, ranks 67th on 2010 Fortune Global 500* 1) MNC 2C located in the UK: It develops the design of European models. 2) MNC 2D located in the UK: It builds local marketing strategies such as 4Ps, STP, and sales strategy for European markets.
3	*MNC 3: South Korea-based headquarters, ranks 78th on 2010 Fortune Global 500* 1) MNC 3C located in the US: It is responsible for the design, technology and engineering of all North American models. 2) MNC 3D located in the UK: It builds local marketing strategies such as 4Ps, STP, and sales strategy for European markets.
4	*MNC 4: South Korea-based headquarters ranks 15th on OICA 2008 Top 20 Motor Vehicle Producing Companies* 1) MNC 4C located in the US: The design facility incorporates 45 workstations and 9 offices. Up to eight vehicles can be modelled simultaneously, and a computerized milling machine permits full-size models to be rapidly created. 2) MNC 4D located in the UK: It builds local marketing strategies such as 4Ps, STP, and sales strategy for European markets.

Table 3.3. Profile of Subsidiaries Sampled for Interviews

3.5.2 Questionnaire Survey

3.5.2.1 Questionnaire Design

This questionnaire survey was designed for team members in cross-national projects. The questionnaire was initially designed on the

basis of the following. 1) *Section 1* (knowledge creation) and *Section 2* (knowledge transfer): Items are given from Martín-de-Castro et al. (2008), Rynes et al. (2001), and Subramaniam and Venkatraman (2001), 2) *Section 3* (organisational conditions and project environment): Items are given from Fleetwood and Hesketh (2006), Jackson and Schuler (1995), and Wright et al. (2005b), 3) *Section 4* (HRM): Items are given from Becker and Gerhart (1996), Bowen and Ostroff (2004), Boxall and Macky (2007), Lepak and Snell (2003), and Zheng et al. (2006), and 4) *Section 5* (background information).

After pilot testing and exploratory interviews, measurement items dealing with task interdependence, leadership, subsidiary autonomy, and specific organisational conditions were added as shown in the attached survey questionnaire and Table 3.1. All paper questionnaires had 8-digit serial numbers to classify them by countries, industries, companies, and organisational types. E-questionnaires were designed and coded for respondents to answer in the PDF file directly. Measurement items for dependent explained variables were scored in the 5-point-metric scale by survey respondents.

3.5.2.2 Sampling

Sample size can be established in the values of a desired confidence level, a maximum sampling error, and a pilot study variance (Shiffler and Adams, 1987). On the ground of Bartlett et al. (2001), sample size was set as more than 5% of population and target population was

defined as ICT and automobile MNCs that had an annual sales profit and firm size similar with those of Fortune Global 500 companies. The sample size of 1040 was big enough when targeting 750 largest MNCs including their 21,600 R&D researchers and marketers in the UK, the US, and South Korea. The suitability of expected sample size should be examined in this determination way through a pilot test. Preliminary pilot testing is adopted to look over whether the sampling frame that includes sample size is adequate (Sarantakos, 2005). The competence of my survey questionnaire is tested at this time as well.

Companies considered as samples were contacted and requested for a questionnaire survey. Contacted companies were Apple, ASE, ASUS, Cannon, Cisco Systems, CNS, Dell, Delphi, Ericsson, Fujitsu, GE, Google, Hitachi, HP, HTC, IBM, Intel, KT, Lenovo, LG, Microsoft, Motorola, Nokia, Oracle, Panasonic, Philips, Samsung, SAP, SDS, Sharp, Siemens, SKT, Softbank, Sony, Sun Microsystems, Toshiba, Xerox, Yahoo, BMW, Daimler, Fiat, Ford, GM, Honda, Hyundai, Kia, Mazda, Mitsubishi, Nissan, Peugeot, Renault, Suzuki, Toyota, VW, Volvo, AstraZeneca, GlaxoSmithKline, Johnson & Johnson, Novartis, Pfizer, and Roche in ICT, automotive, and pharmaceutical sectors. Many companies were reluctant to participate in my surveys due to the issue of confidentiality. However, confidential information was never asked to sampled companies. It was particularly harder to get approval of pharmaceutical companies and thus this sector was removed from target population. Finally, 26 subsidiaries of 14 MNCs agreed to be involved in the survey as seen in Table 3.4. At this time, the

ICT software (S/W) industry was added to examine if there would be a difference or similarity between hardware (H/W) and S/W processes. Project team members participated in the survey through random sampling within target groups, R&D and marketing: stratified sampling.

3.5.2.3 Survey Performance

Survey questionnaires were provided for 1040 MNC employees in the 26 subsidiaries of 7 Korean, 2 German, 1 British, 1 American, 1 Dutch, 1 Swedish, and 1 Taiwanese multinationals. They were delivered by hand via some acquaintances, post, or e-mail from the beginning of June 2011 to the beginning of August 2011. R&D and marketing employees, who previously experienced cross-national projects, participated in this survey. Questionnaires were re-delivered to some employees so as to increase the return rate at the beginning of September 2011. The total response rate was 51.25 per cent with 533 questionnaire data sets after this trial.

However, some incomplete data sets were found during data analysis. Some parts were not answered or the same number was preposterously repeated as the answers through two or three sections. 35 data sets were thus eliminated and additional re-delivery of survey questionnaire to some organisations in which the survey response rate was initially low was tried at the beginning of October 2011. As a result, 60 additional data sets were collected at the beginning of November 2011. The total data sets were 558 at this time and the final survey response

rate is 53.65 per cent finally. An acceptable response rate for mail surveys in social research is 50 per cent (Babbie, 2007). However, many previous studies have a response rate of 10 to 15 per cent.

The main reason why a good response rate was achieved in my research fieldwork was in the assistance of my acquaintances. Acquaintances such as former schoolmates and old fellow workers helped me to distribute and collect questionnaires by pushing their colleagues to promptly complete the survey. Compensating all respondents for money needed a huge budget and thus those acquaintances were selectively compensated with money and gifts. The combination of individual social networks and compensation skills benefited the survey fieldwork. Another method to increase the response rate was to allocate longer time for the survey. My research fieldwork started a few months earlier, compared to my PhD classmates. If I were a master's student, I could not have allocated a long period into surveying.

Survey Questionnaires (Delivered)	ICT H/W	Automotive	ICT S/W
1040 employees in 14 MNCs (26 R&D and marketing organisations located in the UK, the US, and South Korea)	MNC 1 (Korean) MNC 2 (Korean) MNC 8 (Taiwanese) MNC 9 (German) MNC 10 (Dutch)	MNC 3 (Korean) MNC 4 (Korean) MNC 11 (German)	MNC 5 (Korean) MNC 6 (Korean) MNC 7 (Korean) MNC 12 (British) MNC 13 (Swedish) MNC 14 (American)

Table 3.4. Survey Questionnaires Delivered

3.6 Data Analysis

3.6.1 Analytic Induction in Multiple-Case-Comparison

The proposed research employs cross-case comparisons in analytic induction while conducting multiple case studies. Social phenomena can be understood better when they are compared in looking over two or more contrastive cases or situations (Bryman, 2008). This is the reason why cross-case comparisons are required to explore the configurations multiple team relationships in MNC knowledge creation and transfer in contexts. There are two general strategies of qualitative data analysis, analytic induction and grounded theory (Bryman, 2008). Among them, analytic induction is useful for developing the causal explanations of a phenomenon from some cases (Ryan and Bernard, 2000).

Step 1	Some broad hypothetical explanations of research questions
Step 2	Cross-case comparisons: searching them for patterns in similarities and differences
Step 3	Changing hypothetical explanations and adding new causal explanations in order to exclude a deviant case
Step 4	Consistency in cases: hypotheses confirmed
Step 5	Completing the examination of cases: universal explanations

Table 3.5. Cross-Case Comparisons in Analytic Induction: Derived from Bryman (2008)

The results of qualitative exploration in this research are accordingly developed in analytic induction but cross-case comparisons

in it, the Step 2 of Table 3.5, may follow grounded theoretical ways. They might appear in the constant comparisons of grounded theory through developing the categories of explanatory patterns. The process of analytic induction presented by Bryman (2008) is modified for this research as described in Table 3.5. Hypotheses mentioned in the table are different from those of the above quantitative approach. These mean qualitative findings and causal relationships newly-developed through follow-up interviews. NVivo 8 software is used to code and manage qualitative data on the basis of this method. The content analysis of relevant documents is considered to look into contextual factors and supplement interview results in a reasoning process.

3.6.2 Multivariate Analysis of Covariance (MANCOVA)

Some hypotheses accompanied by bivariate are verified in using the unpaired (independent samples) t-tests to compare R&D and marketing or ICT and automobile. However, a multivariate technique is extensively used to observe cross-categorical effects and how control variables mediate causal relationships in research findings. At this time, R&D-marketing functions and ICT-automobile sectors become independent variables in the nominal scale. Dependent variables are set as local team relationships (team socializing, task interdependence, work reporting types, external partner types, and leadership styles), transnational HQ-subsidiary work structures (information dependence, knowledge sharing frequency, geographic proximity, knowledge transfer

methods, and decision autonomy), and HRM practices (individual/group-based settings, performance-free/performance-based compensation, and employee skill/leadership training) for Chapter 4, 5, and 6. Home countries and team size in nominal scale are controlled as covariate variables in multi-way MANCOVA. One of the popular statistical S/W, SPSS 18, is used for this quantitative data analyses.

MANOVA and MANCOVA tables are compared to investigate the effects of covariates. Tables include the statistics of the F test as a part of the multiple regression analysis. At this time, an alpha level and its confidence interval are important for the valid conclusion of research. Engel and Schutt (2009) argue that a reasonable alpha level based on sample size can minimize wrong conclusions caused by Type I and Type II errors. To look into the effect of contexts, some covariates are coded as 0 and 1. A value of 0 is given if categories are in the control group; on the other hand, a value of 1 is given if they are not. At this time, the coefficient of determination, R2, shows the percentage of Y variation explained by all of the X variables (Siegel, 2002). The value must be 0.4 (40 per cent) or higher for social science studies (Allen, 1997).

Multiple regression analysis and logistic regression analysis were initially considered. However, a MANCOVA model was better than a regression model in order to use project team size as a control variable. Logit and probit models cannot be used either because dependent variables must be present in a nominal scale. Although my study has categorical variables such as sectors and functions, using them as

dependent variables can obstruct the focus on what R&D and marketing differently affect. In particular, ANOVA follows the OLS (Ordinary Least Squares) assumption as a permutation of the GLM (General Linear Model). ANOVA is restricted to unrelated categorical predictors, but otherwise it is OLS regression (Baron and Kenny, 1986; Stevens, 1963; 1939). For this reason, residuals are normally distributed and homoscedastic (homogeneity of variance). The other assumption for ANOVA is that observations for one group are independent on those of another. Additionally, larger sample size of more than 20 per cell increases power in the result (Hoaglin and Welsch, 1978). As a result, ANOVA is very similar to regression at the angle of GLM and OLS, including their actual statistical results. There is a critical reason why my research uses MANOVA and MANCOVA instead of multiple regressions in relation to multicollinearity.

3.6.3 Multicollinearity

Multiple regression analysis is suitable for understanding the relationship between variables and predicting a new observation (Siegel, 2002). In particular, an 'F test' to investigate the impact of X variables, as a group, on the Y variable as well as a 'T test' to investigate the impact of each X variable on the Y variable can be implemented in this analysis. If multiple regression analysis were used in my research, independent variables of R&D-marketing and ICT-automotive should be dummy-coded as 0 and 1. However, my categorical variables are inevitably overlapped

because one (e.g. R&D and marketing) in the functional category can belong to the industrial category. For example, the marketing function is a part of both ICT and automobile MNCs. Theses correlated predictors that result in multicollinearity can be an unintended problem in regression. Multicollinearity does not affect the OLS assumption and OLS estimates are still unbiased. However, multicollinearity increases standard errors because confidence intervals for coefficients tend to be wider and t-statistics tend to be smaller in high multicollinearity. It will be harder to reject the relevant null hypothesis in this situation (Cortina, 1994; Ganzach, 1998).

Such multicollinearity can be caused by improper use of dummy variables through failure to exclude a category (Aguinis, 1995). It can be eliminated by forming a new variable through factor analysis if relevant factors are in interval or ratio scale. Regression will not be useful for my research if functions and sectors can be tested together in creating an equation model. In other words, my research would use a regression model if independent categorical variables were clearly independent on each other as the relation between sex and education. MANOVA and MANCOVA become thus a better choice to deal with multicollinearity more easily and reasonably.

3.6.4 Additional Quantitative Analysis

Measurement items for dependent variables can be examined by using a factor analysis by Varimax rotation and a reliability analysis by

Cronbach's α at this time. The factor analysis is performed to find common factors and so to set up independent variables. It follows a normal procedure to extract independent variables for the regression analysis: 1) Deciding on the number of factors from possible variables on the basis of Eigen values, 2) Rotating factors to be easily interpreted, 3) Selecting measurement items from possible variables in using factor loading values, 4) Ensuring that each independent variable consists of three or more items for each factor, and 5) Labelling the newly developed independent variables (Siegel, 2002).

The principle component method in the factor analysis is used to reduce the number of factors reasonably. In the method, factors whose Eigen values are not less than 1 are chosen according to the Kaiser-Guttman rule (Brown, 2006). To clearly interpret selected factors as dependent variables, a rotation method is employed. Quantitative studies that consider the factor analysis mainly use Varimax rectangular rotations. This rotation method is suitable for assuring the dependence of factors. In this analysis, factor variables are selected as measurement items when the factor loading score is not less than 0.4 (Acock, 2008). Each dependent variable is generally recommended to have 3 or more measurement items.

A communality value indicates the variance amount of each variable explained with other variables. In other words, it shows whether extracted measurement items explain the independent variable well. An independent variable must be reconsidered if its communality is low

when it is decided with some measurement items. The criterion value of the communality is generally 0.5 in academic research (Siegel, 2002). In addition, a Cronbach's α value reveals whether an experiment has reliability by internal consistency. 0.7 or a more value is acceptable for Cronbach's α in social scientific research (Nunnally, 1978). Correlation can also be measured to see the association between two variables in using the Pearson's product-moment correlation coefficient. This is generally for eliminating independent variables in multicollinearity to minimize unreasonable correlations. However, this process is not necessary for my research that uses MANCOVA with categorical independent variables.

3.7 Concluding Comments

When research is shaped in critical realism, it is important to grasp fundamental causal trees from the research puzzle. My research does not only pursue the causal relationship between independent and dependent variables in a limited condition, but also causal factors that give rise to differences in categorical alternatives seen through the observed variance in particular variables. Laws such as 'If A, then B.' are usually generated in the close system, and social things or situations can be understood in retroduction (Bhaskar, 1975). For example, a same fact can be observed in situation A and unobserved in situation B. Research needs to investigate what causal factors are present in A and not in B.

In my research project, several variables and their hypotheses linked to local team relationships, transnational team relationship, and

international HRM fits are observed and analysed to investigate whether a group such as R&D and marketing has a causal relationship with a particular variable. However, the relationship does not mean the end of empirical exploration in my research. It becomes more important to find what brings about different observations in R&D and marketing contexts or in ICT and automobile contexts. This is also the reason why my research has carried out pre-exploratory interviews and follow-up interviews separately. Relevant variables and hypotheses are explained in each empirical chapter.

CHAPTER 4: EMPIRICAL STUDY 1

Local Team Relationships in the Knowledge Creation of Foreign Subsidiaries: Task Interdependence and Knowledge Complexity

4.1 Introduction

This chapter explores more micro-organisational team activities in MNC foreign subsidiaries rather than macro-organisational hierarchical structures. It aims at structuring local team features in knowledge creation to explore how R&D and marketing organise them in terms of team socializing, task interdependence, work reporting types, external partner types, and leadership styles. The main focus is on how local employees work in a team or across teams, and how local team relationships are formed in a project. At this point, an MNC project means the creation of new knowledge linked to financial outcomes in both R&D and marketing. MNC knowledge, which this research treats, is thus *R&D technologies* and *marketing packages* including a market research report, a product road map, and some other marketing stuff such as event and advertisement plans required for each commercial

product. Knowledge becomes more tangible in this situation, but R&D and marketing know-how are also indirectly investigated. That is also the reason why Chapter 6 deals with high performance work practices in relation to knowledge creation and transfer in MNCs.

Effective knowledge processes are composed of sharing, creation, and utilization (Hislop, 2005). An important point is that knowledge transfer activities in MNCs involve the succession of knowledge creation and transfer. The creation of knowledge resources thus should not be overlooked in observing the knowledge transfer of MNCs. Lam (2003) investigates knowledge transfer from foreign R&D networks as the learning activities of MNCs in the pharmaceutical and ICT industry. She investigates how to manage local academic institutions in host countries to build distinctive organisational learning models. My research focuses more on the local relationships and activities to review how knowledge is shaped in host countries. The study of Hocking et al. (2007) more deeply delves into the succession of knowledge creation and transfer processes by treating the behaviour of local employees. However, knowledge nature newly-added through local team activities and relationships could be more explored.

Various project teams engage in knowledge creation activities and this structure causes a need for coordination between them (Nonaka et al., 2006). A framework of Zárraga and Bonache (2005) particularly shows that high-care team relationships are positively linked to knowledge creation and transfer. It is surely critical to manage team

relationships in knowledge processes but there is a question about how differently team relationships appear for successful knowledge outcomes in different subsidiaries. This chapter thus reviews team relationships in MNC foreign subsidiaries and local relationships with some types of external organisations. It tries to investigate knowledge creation activities at the subsidiary level in order to distinguish from the relational factors with parent companies. Socialization and electronic communications, externalization and work progress reporting, combination and external networks, and team interdependence and task leadership in knowledge creation are reviewed with some hypotheses.

4.2 Theoretical Framework and Hypotheses

4.2.1 Socialization and Communication Technologies

Team relationships can firstly be reviewed during focusing on the local relationships of MNC subsidiaries. There are team activities that show how knowledge is created across teams for a project. Knowledge creation in marketing and R&D subsidiaries can be observed in an integrated model of Nonaka and Takeuchi (1995). The model has four different stages of knowledge development: *socialization* that means tacit to tacit knowledge, *externalization* that means tacit to explicit knowledge, *combination* that means explicit to explicit knowledge, and *internalization* that means explicit to tacit knowledge. As seen in Figure 4.1, both MNC subsidiaries and its parent company will have repeatedly four processes in a specific project.

The whole point of Nonaka's framework is that firms need to go through these four stages to create knowledge effectively. This model is a within-firm model and Nonaka does not deal with knowledge processes across firms. However, MNC knowledge transfer studies inevitably have two objects of observation: a subsidiary and the parent company. They are independent organisations located in different geographical areas but work together in a specific project. In particular, the study of Minbaeva and Michailova (2004) reviews such cross-national co-work with expatriates, international working groups, and international assignments. This fact means that they have a separated knowledge creation process but their intermediate and final outcomes are shared. It is not easy for tacit knowledge to be shared long distance. Thus, explicit knowledge formed through the externalization or combination process is mostly shared between a subsidiary and the parent company. My research does not empirically test or theoretically develop this model, but borrows its explanatory variables to explore team relationships and work structures. Again, information can be transferred across countries in the processes of externalization and combination. This is because these two processes deal with explicit knowledge which makes it easy to share knowledge at a long distance. Well-developed video conference call systems in MNCs have made knowledge transfer across countries more conveniently in these processes.

When the knowledge creation model is understood in the multinational environment of my research, both marketing and R&D

knowledge are initiated from tacit ideas that individuals have. Such tacit ideas are accumulated through previous *internalization* and *socialization* processes. For a new project outcome, knowledge should be explicit to produce necessary data in the process of *externalization*. Even technical knowledge in R&D units is likely to go via the process in which the units share idea or experience to gain required information. Then a kind of knowledge is combined and reformed with another in the *combination* process. For example, a laptop computer will need an LCD monitor and some other components as well as the main chip board. Several technologies for them will be knowledge units that should join together for a final product. This *combination* process can be much longer because new ideas and skills are possibly required to assemble different knowledge units. This situation will require additional *internalization*, *socialization*, *externalization*, and *combination* for other sorts of knowledge. The four key processes are thus repeated through trials and errors in an MNC project. At this time, new know-how and ideas can be gained through the *internalization* process.

Most MNC subsidiaries need co-work with other subsidiaries or the parent company across countries (Schulz, 2001). Teams across countries will share and improve data with each other in transnational *externalization* and *combination* as depicted in Figure 4.1. Explicit knowledge rather than tacit knowledge will be transferred easily across countries in these two processes. This chapter does not deal with a knowledge process in the relation with the parent company but focuses

on local knowledge creation in a foreign country. The left part of Figure 4.1 is focused on for the review of local team activities in knowledge creation. In addition, it mainly explores *socialization*, *externalization*, and *combination* because these three can be observed clearly in MNC projects. Tacit knowledge from *internalization* is regarded as a prerequisite for a new project. The *internalization* process is an *individual process* rather than a *team process* as well. My research takes an interest in team relationships in both knowledge creation and transfer.

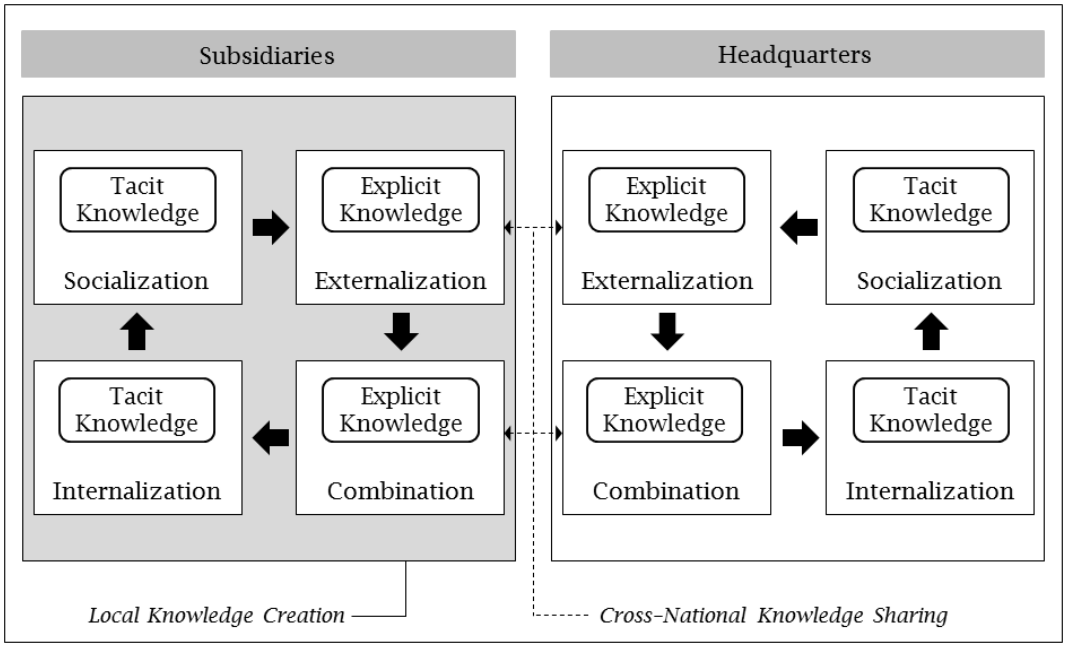


Figure 4.1. Applying the Nonaka and Takeuchi (1995) Model into an MNC project

Socialization is thus a starting point of the knowledge creation process, and tacit individual ideas and experiences are shared with team

members at this stage. Socialization was originally defined as the process of creating tacit knowledge through shared experiences (Nonaka, 1994). It is more extensively used as interactions between individuals in the knowledge creation process. However, acquiring tacit knowledge without language through observation, imitation, and practices is a key point here. It is necessarily accompanied with person to person joint activities and its success depends on shared feelings, beliefs, and emotions among individuals (Rynes et al., 2001). Socialization is thus face-to-face interactions formed when working offline for sharing of experiences (Athanassiou and Nigh, 2000; Pedersen et al., 2003). It typically occurs in sharing experiences directly at work through a tutor-apprentice relationship (Nonaka et al., 2000; Nonaka and Takeuchi, 1995). However, face-to-face interactions can also be based on informal communications through social activities (Gupta and Govindarajan, 2000; Minbaeva and Michailova, 2004). Marketing knowledge has often appeared in research of knowledge ambiguity (Simonin, 1999a; 1999b). This tacit feature may be weakened in more systematic MNC projects. To test relevant hypotheses, formal and informal activities identified in Huang and Wang (2002), Martín-de-Castro et al. (2008), Nonaka and Toyama (2003), and Subramaniam and Venkatraman (2001) are employed.

H 4.1. There is a difference between R&D and marketing project teams in terms of the frequency of formal socialization activities.[6]

H 4.2. There is a difference between R&D and marketing project teams in terms of the frequency of informal socialization activities.

Information and communication technologies have changed organisational structures (Te'eni, 2001). These technologies enable employees to have both *formal and informal communication* (Kiesler and Sproull, 1992). In particular, their effect on face-to-face interactions has been explored in MNC knowledge transfer studies. Electronic communications can support or substitute face-to-face meetings between globally dispersed teams (Kirkman et al., 2004; Walsham, 2001). They will be helpful for cost efficiency in the interaction of widely-dispersed organisations (Walsham, 2001). However, tacit knowledge cannot be shared easily through information and communication technologies. An effective mix of face-to-face and electronic interactions is needed in global teams for this reason (Maznevski and Chudoba, 2000). A concern is that web-based technologies such as e-mails and IT databases make knowledge more explicit as codified knowledge (Zack, 1999). This explicit nature of communication technologies themselves brings about a

[6] For an unpaired (independent samples) t-test, a null hypothesis (H_0) and a research hypothesis (H_1) are indicated in equations: H_0: $\mu_1 = \mu_2$ (Their means have a difference.), H_1: $\mu_1 \neq \mu_2$ (Their means do not have a difference.) To see why hypotheses in the chapter do not use the terms of 'greater than' or 'smaller than', please go to Footnote 35.

question about how they influence tacit knowledge in the *socialization* process. Even marketing subsidiaries have well-developed electronic communication systems in world-famous MNCs. Tacit marketing knowledge may tend to be ruled out in cross-national MNC projects. The effect of communication technologies for formal and informal use on *socialization* is thus explored with the following hypotheses.

H 4.3. There is a difference between R&D and marketing project teams in terms of using IT as a communication tool mainly for formal work.

H 4.4. There is a difference between R&D and marketing project teams in terms of using IT as a communication tool mainly for informal talk.

4.2.2 Externalization and Work Progress Reporting

As above-mentioned, this chapter investigates *socialization*, *externalization*, and *combination* to look into local team relationships in MNC projects. This section explores *how to report a work progress* as the *externalization* way of tacit ideas in MNC projects. The *externalization* process is crucial in MNC projects because it facilitates the transfer of project outcomes to other teams in the same subsidiary, other subsidiaries, or the MNC parent company by making knowledge more explicit. Tacit knowledge is converted to a readily understandable form in

externalization (Nonaka, 1994; Nonaka and Takeuchi, 1995). It is normally done through the use of metaphors, dialogues, or analogies in a form that can be understood easily by others (Nonaka, 1994; Nonaka and Konno, 1998). However, the use of dialogues and metaphors are not statistically significant for this process in certain contexts (Nonaka and Von Krogh, 2009). The key is that knowledge partly or wholly loses its tacitness through the *externalization* process so that other people can get a better understanding (Byosiere and Luethge, 2008; Nonaka and Von Krogh, 2009).

This section thus focuses on what makes knowledge less tacit in the work progress reporting. Written documentation is a tool that presents project outcomes in knowledge externalization. Collaboration with other members and supporting tools can be required to present knowledge as well (Rynes et al., 2001). Reliance on formal written documentation sometimes contrasts with reliance on informal face-to-face communication (Robertson et al., 2003). As a result, the frequent use of written reports can result in the loss of knowledge tacitness and the increase of knowledge explicitness. On the other hand, a collaboration system in presenting work progresses can promote unrecorded verbalization rather than documentation. Collaboration has been linked to face-to-face meetings and thus verbalized talks can become more frequent (Ardichvili et al., 2003; Baltes et al., 2002). Lab-based scientific knowledge tends to be newly introduced through a team collaboration system. Such a collaboration system can be effective to report

complicated project outcomes explicitly. Nevertheless, it may cause additional tacitness as well as additional explicitness through the increase of face-to-face talks. Items for the measurement of *externalization* methods come basically from Huang and Wang (2002), Martín-de-Castro et al. (2008), Nonaka and Toyama (2003), and Subramaniam and Venkatraman (2001). This part thus formulates some hypotheses regarding how knowledge outcomes are presented in the *externalization* process as follows:

H 4.5. There is a difference between R&D and marketing project teams in terms of the frequency of written documentation for daily routines.

H 4.6. There is a difference between R&D and marketing project teams in terms of having a formal team collaboration system to report work progress.

4.2.3 Combination and External Networks

Externalized knowledge pieces and intermediate outcomes in a project can be collected, disseminated, and edited in *combination* (Nonaka, 1994; Nonaka and Takeuchi, 1995). Figure 4.1 shows combination in a local subsidiary and in the relation with the parent company. *Combination* processes with other subsidiaries or some other external networks are reviewed as the local process of a foreign subsidiary in this

chapter. This is because only information inflows to the subsidiary for local knowledge creation are treated here. Knowledge outflows to other subsidiaries or the parent company are explored in the next knowledge transfer chapter. This section specifically focuses on what sorts of information are added into project outcomes in MNC subsidiaries before they are transferred to the parent company. A point is that the *combination* process of MNC subsidiaries can include knowledge sets initialized from external organisations locally-located. Managing external information is important for MNCs to achieve innovations and thus external sources must not be overlooked (Tsai, 2001). In relation to this, absorptive capacity has been a popular topic in knowledge transfer literature since Cohen and Levinthal (1990) argued about its determinants. A positive relationship between absorptive capacity and external knowledge sourcing was already verified in previous studies. However, the ability to learn through external sources is not only dependent on absorptive capacity but also the *willingness of external sources for cooperation* (Simonin, 1999b).

For the reason, what sorts of external sources are involved in the combination process and what the external providers do there are critical in knowledge creation. Organisations specifically form some types of partnerships in their supply chains to get external information in the cooperation (Malhotra et al., 2005). This section thus investigates what types of partnerships are formed when external knowledge is combined with subsidiary knowledge. The characteristics of organisational

knowledge combined in knowledge absorption can be analysed along the dimensions of codifiability and complexity (Kogut and Zander, 1992). This means that different features of tacitness and explicitness can be found through external relationships. It is a reason why my research takes an interest in the partnerships with external organisations. At this point, Bierly III et al. (2009), Lichtenthaler and Lichtenthaler (2010), and Reagans and McEvily (2003) will point out passing over the fact that knowledge acquisition from external sources is affected by knowledge tacitness itself. This fact indicates the intrinsic nature of external knowledge and knowledge absorption obstructed by it. However, my research explores what is added into knowledge rather than whether knowledge absorption is successful or not. My focus is not on the intrinsic tacit-explicit nature in external knowledge itself but newly-added tacit-explicit nature through external relationships. Measurement items are employed from previous studies in knowledge absorption literature. Universities, research institutes, buyers, and suppliers are considered as regional networks (Almeida and Phene, 2004; Saxenian, 1994; Song et al., 2011). External agencies are also reviewed in firm knowledge absorption from external sources (Van Den Bosch et al., 1999).

H 4.7. There is a difference between R&D and marketing project teams in terms of types of external sources involved in a project.

H 4.7.1. A supplier provides necessary information.

H 4.7.2. A buyer provides necessary information.

H 4.7.3. An agency provides necessary information.

H 4.7.4. An academic institution provides necessary information.

H 4.7.5. Another subsidiary provides necessary information.

H 4.7.6. Any other local partner provides necessary information.

4.2.4 Task Interdependence and Leadership Styles

Team activities and work structures in the knowledge creation processes of Nonaka and Takeuchi (1995) have been reviewed in this chapter so far. As previously-stated, this is because various project teams require coordination among them for the effectiveness of knowledge creation (Nonaka et al., 2006). This chapter thus tries to identify local team relational factors necessary for team coordination in knowledge creation. MNC R&D and marketing may need distinctive knowledge-based team relationships and coordination in a project. At this stage, a point that must be considered in relationships of knowledge work teams is task interdependence (Janz et al., 1997). Task interdependence can have a positive influence on team knowledge sharing processes (Gladstein, 1984; Staples and Webster, 2008). Task interdependence specifically helps internal knowledge to move to other teams or bigger units (Foss and Pedersen, 2004). The next chapter separately reviews interdependent structures between foreign subsidiaries and the MNC parent company. It differently deals with international team relationships in transnational knowledge transfer. On the other hand, this chapter explores task

interdependence in the local knowledge creation process of subsidiary teams.

Most MNCs reveal one of pooled interdependences, sequential interdependence, and reciprocal interdependence in the control of subunits (Thompson, 1967). At this point, the term of subunits can indicate teams or smaller work units in a specific subsidiary as well as subsidiaries in the international work structure of an MNC. These work groups in mutual awareness and interaction own at least a minimum degree of goals and task interdependence (Earley and Gibson, 2002). Pooled interdependence reveals the lowest degree of interdependence among work groups. Work does not flow between these work groups in this form but each work is pooled to their department or subsidiary. Sequential interdependence is a higher level of interdependence and the outputs of one work group become the inputs of another in this serial form. Reciprocal interdependence is the highest form of interdependence and occurs when work output is handed back and forth between different work groups (Hirst, 1988; Miner, 2006; Thompson, 1967). Subsidiary teams or smaller work groups work together for a project and have shared roles for the effective process of a task force. Task interdependence becomes more reciprocal when work distinction between a work group that has a preceding role and another that has a succeeding role is unclear in joint duties and shared outputs.

H 4.8. R&D and marketing functions in subsidiaries differ in terms of a clear distinction between preceding and succeeding roles that minimizes joint duties and outcomes in a project.

The term of task interdependence has been conceptualized with other terms such as required interactions, inter-agent interactions, required interdependence, organisational interdependence, goal interdependence, and role interdependence on group functioning (Kiggundu, 1981; Thomas, 1957; Van der Vegt and Janssen, 2003). They have been viewed as key factors that influence organisational work structures or processes. How goals, roles, or tasks are shared between members in team or departments has been investigated in the effect of interdependence. A point to note here is that the team effectiveness of goals, roles, or tasks can be affected by team leaderships (Gladstein, 1984). Organisational knowledge creation processes can thus be affected by not only task interdependence but also team leadership (Stewart and Barrick, 2000). However, team leadership is a broad and inclusive concept that treats elements such as traits, behaviour, and vision that motivate group members. A few studies focus more concretely on relationships between leaders and members in the group work process (Jung and Avolio, 1999). *Task leadership* is required to solve task-related problems, whereas *maintenance leadership* is needed to manage group life (Gladstein, 1984). Task leaderships can be more relevant to the MNC project of knowledge creation. In this leadership, team leaders

communicate task-related information with members more frequently (Fry et al., 1986). In addition, the degree of task interdependence can influence the role of leaders for team members (Chen and Tjosvold, 2005; Liden et al., 2006). The careful attention level of leaders into team members and project matters undergone by the members are thus reviewed in the knowledge creation process of MNC subsidiaries. The effect of task interdependence on task leadership in R&D and marketing can be tested through above Hypothesis 4.8 and following Hypothesis 4.9.

H 4.9. R&D and Marketing functions in subsidiaries differ in terms of the attention level of team leaders into members in dealing with project matters.

4.3 Results

Knowledge creation activities and task interdependence between work groups have constructed the above theoretical framework for local team relationships in knowledge creation. Some relevant factors such as electronic communications, written reporting, external networks, and leader roles were considered to compare team relationships in R&D and marketing projects. Above *H4* hypotheses are the starting points and they indicate fundamental effects by the functional variation, R&D and marketing. The effects of multiple categories on some critical variables are more explored through two different multivariate models shortly afterwards. Before everything, my research wanted to compare R&D and

marketing while verifying main hypotheses in unpaired (independent samples) t-tests. To investigate whether the difference between the two samples' averages is statistically significant, a t-test is conducted under the assumption that the variances of two populations are equal ($\sigma_1^2 = \sigma_2^2$).

There is a question regarding why one-way ANOVA is not used for the test. Independent samples t-tests use t-statistics, whereas one-way ANOVA uses F-statistics. However, they are alternative choices to compare two different groups, R&D and marketing. The independent samples t-test and one-way ANOVA are exactly the same on the results when two groups are compared only. Mathematically, F-statistics in one-way ANOVA for two groups are the square of t-statistics in the independent samples t-test (Ford et al., 1986). This fact also reveals the relation of the t-distribution and the F-distribution. P-values are exactly the same on this relation and thus the same test results are derived. In other words, the unpaired (independent samples) t-test is a specific case of one-way ANOVA and they can be used alternatively when compared groups are only two. Multi-way MANOVA and MANCOVA are used as the next step to look into the interactive effects of organisational functions and industrial sectors as well as multivariate effects of dependent variables. For this reason, one-way ANOVA was not necessary to focus on the difference between R&D and marketing with main hypotheses. Extended findings were analysed through valid quantitative and qualitative methods as described in the methodology chapter.

4.3.1 Socialization and IT Communications

4.3.1.1 Survey Results

Nine measurement items for three formal socialization activities and six informal socialization activities were provided for Hypothesis 4.1 and 4.2. They were derived from previous studies in order to investigate socialization activities in R&D and marketing subsidiaries. Reliability analysis by Cronbach's alpha was performed to examine the internal consistency of a variable measured by multiple items. Examining whether these items can reveal consistent results for socialization was needed because they were previously used in different studies and conditions. Table 4.1 shows that the overall alpha value of nine items is between eight and nine. This level indicates good reliability and there is no item that can significantly increase the level when it is removed. This fact means that all items are worth measuring for socialization activities. However, there was a possibility that they would compose the only one component such as *socialization activities* or a few different components such as *formal activities* and *informal activities*. Factor analysis was thus performed to see how nine items would be grouped as homogeneous components for a variable. It might remove redundancy or duplication from a set of correlated variables. Factor analysis is primarily performed to shape independent variables from multiple measurement items. However, it can be used for dependent variables in analysis of variance (ANOVA) as well as independent variables in regression analysis (Scheiner, 2001).

Reliability Analysis – Scale (Alpha)
Correlation Matrix

N = 558

	1A-1	1A-2	1A-3	1A-4	1A-5	1A-6	1A-7	1A-8	1A-9	Alpha if Item Deleted
1A-1	1.000									.875
1A-2	.400	1.000								.859
1A-3	.371	.606	1.000							.857
1A-4	.247	.461	.472	1.000						.868
1A-5	.461	.415	.426	.399	1.000					.861
1A-6	.357	.430	.523	.454	.585	1.000				.856
1A-7	.342	.526	.456	.399	.505	.558	1.000			.857
1A-8	.286	.438	.469	.404	.424	.499	.525	1.000		.860
1A-9	.223	.394	.461	.394	.422	.483	.486	.551	1.000	.864

- Reliability Coefficients: 9 Items
- Alpha = 0.875, Standardized Item Alpha = 0.876

Table 4.1. Reliability Analysis – Socialization

The results of factor analysis are shown in Table 4.2 and the left-side numbers mean the matching questions of a survey questionnaire attached in the appendices. Through the factor analysis, nine items compose the only one component as seen in Table 4.2. Both formal and informal activities can be regarded as measurement items for the same variable for the reason. There is no evidence that they particularly indicate one of formal and informal activities because differences between factor loading values are not very big. For example, the factor loading of *Formal Activity 3 (1A-6)* is greatest as 0.774. However, there are some more items that have the value of over 0.700 and thus the variable cannot be named *formal socialization activities*. It seems to be reasonable to name the newly-formed variable *socialization activities*. The terms of formal socialization activities and informal socialization activities are still used in this chapter but it is not statistically significant to distinguish them from each other. In addition, Table 4.2 includes more information on *IT use for informal talk (1D-1)* related to Hypothesis 4.4.

Hypothesis 4.3 and 4.4 are separately tested to observe an effect of IT communication tools on socialization in this section. However, *IT use for informal talk (1D-1)*, which has a factor loading values of 0.585, is consistent with other socialization items as seen in the table. This fact reveals a possibility that *IT use for informal talk* has a similar feature or effect with socialization activities, and thus it must be discussed further with Table 4.3.[7]

N = 558

Component		Component	
	Component		Component
	1		1
1A-6	.774	1A-6	.775
1A-7	.759	1A-3	.757
1A-3	.754	1A-7	.743
1A-2	.733	1A-2	.734
1A-5	.726	1A-5	.716
1A-8	.724	1A-8	.710
1A-9	.694	1A-9	.695
1A-4	.658	1A-4	.663
1A-1	.554	1D-1	.585
		1A-1	.548

- Factor Loading Values
- The solution was not rotated because only one component was extracted.

Table 4.2. Factor Analysis – Socialization

The independent samples t-test was performed for each of nine items regarding Hypothesis 4.1 and 4.2. All factor loading values were previously greater than 0.5 and thus each item might create independent explanation distinctive from others. In other words, there was no data reduction in testing hypotheses with measurement items linked to socialization activities. Each of formal and informal activities was tested

[7] In fact, *IT use for formal work* and *IT use for informal talk* are treated as a combination activity and a socialization activity respectively in previous studies. However, this chapter separately looks at them to observe how the different use of IT communication tools affects the tacit and explicit feature of knowledge.

using the unpaired (independent samples) t-test to compare binary variables, R&D and marketing. The test result indicates that there is a difference between R&D and marketing project teams in terms of the frequency of formal socialization activities and the frequency of informal socialization activities in MNC subsidiaries. It is not necessary to distinguish formal activities from informal activities. The frequency of all socialization activities is higher in R&D project teams than in marketing project teams without exception.

		N
Function	R&D	278
	Marketing	280

H 4.1 to H 4.4	$\sigma_1^2 = \sigma_2^2$		*T*	*df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Informal Activity 1 (Q'naire *1A-1)*	.000	Not assumed	-5.326	515.103	.000	R&D	3.83	-.551	-.254
						MKTG	3.43		
Informal Activity 2 (Q'naire *1A-2)*	.699	Assumed[8]	-9.070	556	.000	R&D	3.44	-.903	-.582
						MKTG	2.70		
Informal Activity 3 (Q'naire *1A-3)*	.879	Assumed	-9.213	556	.000	R&D	3.53	-.884	-.573
						MKTG	2.80		
Formal Activity 1 (Q'naire *1A-4)*	.289	Assumed	-7.616	556	.000	R&D	3.36	-.870	-.513
						MKTG	2.67		
Formal Activity 2 (Q'naire *1A-5)*	.834	Assumed	-6.965	556	.000	R&D	3.75	-.639	-.358
						MKTG	3.25		
Formal Activity 3 (Q'naire *1A-6)*	.000	Not assumed	-9.386	554.516	.000	R&D	3.67	-.852	-.557
						MKTG	2.96		
Formal Activity 4 (Q'naire *1A-7)*	.132	Assumed	-9.567	556	.000	R&D	3.60	-.918	-.605
						MKTG	2.84		
Formal Activity 5 (Q'naire *1A-8)*	.794	Assumed	-8.634	556	.000	R&D	3.57	-.834	-.525
						MKTG	2.89		
Formal Activity 6 (Q'naire *1A-9)*	.471	Assumed	-8.488	556	.000	R&D	3.51	-.836	-.522
						MKTG	2.84		
Informal Use of ICT (Q'naire *1D-1)*	.647	Assumed	-8.622	556	.000	R&D	3.40	-.994	-.625
						MKTG	2.59		
Formal Use of ICT (Q'naire *1D-2)*	.573	Assumed	2.036	556	.042	R&D	3.58	.006	.315
						MKTG	3.74		

Table 4.3. Univariate Effects of Functions (at $p < 0.05$ level) – Socialization

[8] A p-statistic in the Levene's test is 0.699, which is greater than 0.05 (the conventional 5% level). It means that $\sigma_1^2 = \sigma_2^2$ cannot be rejected and thus the assumption of equal variances is valid.

For example, Table 4.3 reveals that *Informal Activity 2* uses statistics in the case of equal variance assumed. A t-statistic and a p-statistic are -9.070 and 0.000. The absolute value of this t-statistic is larger than the absolute value of a critical t-value (t±0.025), ±1.96 (α = 0.05). The p-statistic is smaller than a critical p-value, 0.05, as well. In addition, the 95% confidence interval by lower and upper values does not include 0, which means no difference in averages. A null hypothesis is thus rejected but a research hypothesis is supported by test results. A difference between the means of two groups is thus statistically significant at the 5% level (α = 0.05). As a result, *Informal Activity 2* is more frequent in R&D project teams because the mean of R&D (3.44) is bigger than the mean of marketing (2.70). Other socialization activities have also been tested in the same way and R&D project teams tend to have socialization activities more frequently in foreign subsidiaries according to the test results.

Furthermore, Hypothesis 4.3 and Hypothesis 4.4 were tested in the same way in order to investigate the different use of IT communication tools in marketing and R&D. These two groups were expected to use IT as a communication tool for formal work (Questionnaire 1D-2) or informal talk (Questionnaire 1D-1) primarily. Test results show that there are differences between R&D and marketing project teams in both cases of using IT communication tools for formal work or informal talk. The mean of marketing is greater than the mean of R&D in using IT communication tools for formal work as seen in Table 4.3,

whereas the table reveals the mean of R&D is greater than the mean of marketing in making frequent use of IT communication tools for informal talk. These differences are statistically significant at the 5% level and thus a fact regarding how ICT is mainly used in project teams is derived from those statistics. R&D project teams in MNC subsidiaries employ web-based IT tools such as e-mailing and blogging to informally communicate with members rather than to communicate with them for formal work. On the other hand, marketing project teams in MNC subsidiaries tend to mainly treat IT communication tools for discussion concerning formal work issues rather than informal talk. This result only indicates the *differences of IT communications* and it cannot be exaggerated as differences in IT use for other purposes. In formal work processes, R&D project teams also use IT tools by preference but they are likely to be for managing work data rather than communicating with project members.

4.3.1.2 Knowledge Complexity Clarified by Qualitative Analysis

Above findings can be more explored toward what it means in the knowledge complexity literature. Knowledge complexity is formed in some conditions such as non-codified information, dependence on other components, and strong ties between knowledge exchange units (Hansen, 1999; Teece, 1986; Winter, 1987; Zander and Kogut, 1995). Socialization is likely to be connected with non-codified information at this point because it forms tacit knowledge (Nonaka, 1994). An interest is in what of marketing and R&D processes is linked to the tacit nature of knowledge

in the typical projects of MNC subsidiaries. R&D knowledge has been recognized as something more tangible than marketing knowledge in previous studies. This is because R&D technologies have not been compared with marketing know-how in most cases (Aydin and Terpstra, 1981). However, both marketing and R&D knowledge become more explicit when they are reviewed as project outcomes. Even marketing knowledge is specified to be informative for the success of MNC projects. Above quantitative analysis shows that members in marketing projects communicate with each other more frequently by using IT tools in formal work processes. Therefore, organisational intranet and e-mail systems become more important for team communications in the marketing work structure. This situation was linked to marketing employees less socialized as described in the test results.

There is a question regarding why IT team communications in marketing knowledge processes result in the decrease of socialization. When interviewees were asked about work structures and activities in their team, R&D employees said that:

> My team is responsible for building a Component X[9]. Can I talk about this? (a question to himself) It is confidential. Please be careful when you write about this in your thesis. Um, anyway (pause), this component should work together with another component, Component Y. Another team is responsible for this

[9] The specific names of technical components have been removed because of an ethical issue in relation to confidential information and anonymity.

part. For this reason, I have to conduct technical trials and errors with team members many times in a lab (MNC 1C-1).

During a project, we feel free to visit other teams to talk about or learn something. Another team member can be a teacher to me (MNC 1C-3).

Yes, of course. Working together with my team or another team members in a lab is a daily routine. We meet and talk together every day (MNC 2C-3).

IT communication is not very useful for work. You know (pause), face-to-face learning is beneficial to our work. But many people use Facebook and Twitter personally out of regular working ours (MNC 2C-2).

The car engine is not very simple. Several parts such as a pump and (pause) um (pause), I cannot say many things. They should be put together without a problem. How do you think we make that possible? We test and test several times and correct problems together (MNC 3C-2).

Electronic communications? What is it exactly? IT Database or IT conversation? We use IT database and a groupware to save data

outcomes. But we usually communicate directly. Using SNS, we talk informally, of course (MNC 4C-1).

In contrast, marketing employees mentioned more on independent daily routines, illustrated by the following comments:

> Brainstorming? Yes, it is important but it is done before starting an important task. After brainstorming, each employee work more independently (MNC 1D-2).

> We work in different places many times for external meetings. So (pause), we prefer talking with each other and reporting work progress through a groupware, SNS, and e-mail (MNC 2D-1).

> People are very busy doing individual work and thus we make efforts to reduce meetings. But we have a formal meeting at the beginning of each week. Exchanging e-mails to share work issues is more frequent (MNC 3D-2).

> Normally, we have a regular meeting at the beginning of each week and sometimes on Friday, and (pause) (MNC 4D-3).

> I feel IT conversations are effective for collaboration. Yes, we need to work together if necessary. But to save time (pause) (MNC 4D-2).

Thus, a causal tree gained from qualitative analysis indicates *a relatively small portion of face-to-face discussion* and *more independent daily routines* in marketing projects. Marketing work processes based on more independent daily routines try more effective communications through web space or telecommunication tools. This communication method decreases face-to-face discussion and leads to less frequent offline meetings, compared to R&D. For this reason, marketing project members are prevented from being more socialized. Electronic communication in the work process makes people unlikely to perceive themselves as a group member (Kiesler and Sproull, 1992). Additionally, marketing project teams have a form of temporary TF unlike R&D project teams, so people from different teams temporarily work together in many cases. Socialization activities decrease in this environment because of the lack of rapport among temporary members from other routine teams.

In addition, there is a reason why IT communication tools for informal talk are linked to the increase of socialization as seen in Table 4.3. A tendency that informal talk and activities are considered as an extension of work by R&D employees is found through interview results. They participate more actively in informal talk and activities to spend free-time with colleagues. A notable thing is that informal talk through IT

communication tools in the R&D process promotes sharing private emotion and thought. Such informal talks are recognized as an extension of face-to-face relationships in workplace by R&D employees. Qualitative analysis reveals that R&D employees preferably use face-to-face meetings. R&D researchers spend much more time working together in most projects. There is a reason why the face-to-face work structure is effective in R&D projects. Several errors happen in R&D knowledge development and they are corrected in cooperative trials. Electronic communication is not effective for formal work because there are different results based on various options and online e-text is bounded by many restrictions in the process of finding the best answer. Technological trials require offline meetings and immediate discussions in a laboratory in many cases.

There is evidence that face-to-face co-work adds tacit nature into MNC knowledge. R&D project outcomes are undoubtedly coded well and thus explicit at this time. As seen in the following survey results of Table 4.6, R&D technologies are more frequently classified, reused, combined, and transformed from accumulated files and databases. However, face-to-face communications provide R&D knowledge with tacit nature in *applying technical skills and experiences*. How technical issues are solved or how knowledge is modified is not reported point by point.

When interviewees were asked about working together, and shared or unshared skills/know-how/knowledge, R&D employees said that:

> When we work together, a person has know-how to improve the speed of Component Z and another person has to improve its quality. If the work partners are changed (pause), I do not know (pause), I do not want to think about that. Errors will occur more often, probably (MNC 1C-2).

> Repeated tests and errors? All of them are not reported. It is impossible. How can we do that? Of course, outcomes are saved in the database (MNC 3C-3).

> We make an effort to report all processes and our trials. But we experience a lot of different trials and what/how we have done in the trials may be missing in our database (MNC 1C-4).

> The help of other members is important because they have specialized skills (MNC 3C-1).

These form ambiguity in the technological causal links of R&D knowledge and the ambiguous links create application problems when a part of existing technologies must be reused and transformed with other new technologies. R&D knowledge as a project outcome is explicit in itself but the technical application process in which the outcome is shaped with previous outcomes creates tacit nature. A map of this application process is necessary for the new version of a product, but its detailed instructions

are often missed and not saved in full when stored in a database. In other words, an R&D database has explicit technological sources; nevertheless, their technical manuals do not fully reveal how sources have been combined with others and newly-applied into new outcomes. This kind of instructional knowledge shared in a specific group through face-to-face communication remains non-codified and then R&D outcomes become more complex when such *application skills and know-how* are accumulated.

On the other hand, marketing employees say that face-to-face co-work is not very frequent, but most work outputs are reported and shared well through systematic work design and processes, as follows:

> Sub-sales-networks may have invisible skills and they will not be reported normally. But my organisation has to build embodied (pause) more concrete marketing plans and then give clear guidelines to the sales networks. Therefore, we have clearer work processes, tasks, and individual responsibilities (MNC 1D-4).

> Yes, we have marketing know-know but I believe it is reported and shared in our subsidiary. Probably, you might be thinking about sales know-how. It is not about the subsidiary level but external sales organisations. We have a formalized work system,

so information/data is created and reported by individuals according to the systematic processes (MNC 3D-1).

I want to say we have systematic co-work structures. We effectively work together in assigning individual tasks and sharing the outputs. I think most of them are reported and shared (MNC 2D-3).

Dependence on other components and strong ties between knowledge exchange units were previously mentioned as other factors that cause knowledge complexity (Hansen, 1999; Teece, 1986; Winter, 1987; Zander and Kogut, 1995). R&D work processes have a semi-permanent taskforce system, which means a continuous co-working structure with other team members. R&D employees belong to their routine teams but work together with other team members in a place such as a laboratory for a specific project day after day. They do not usually have any need to change the existing team formation for a new taskforce because of the well-constructed co-work system. On the other hand, marketers from different routine teams tend to work separately after roles are assigned through brainstorming when a new taskforce is formed. Individual work responsibilities become higher at this time and thus marketers work more independently.

This difference is because R&D has relatively *higher dependence on other knowledge components* than marketing has. For example, a main

technology for an electronic device is affected by sub-technologies for some small chips such as semiconductors and transistors. The next chapter states that knowledge modification is repeated through cooperation between a team in subsidiary and another in HQ. This modification also occurs in the cooperative work structure between subsidiary teams or smaller work groups that are responsible for adjacent sub-technologies. R&D researchers are closely related to each other to assemble sub-technologies and let them function together. On the other hand, marketers work independently in separated places. Working in the same space thus facilitates *strong ties* between R&D work teams. In sum, dependence on other knowledge components results in spatial links between teams and then spatial links cause strong ties between teams. *Knowledge complexity* is more accelerated in these situations of R&D teams.

4.3.2 Documented Daily Routines and Collaborative Reporting

4.3.2.1 Survey Results

Some factors that cause tacit and complex nature in knowledge have been explored. Written documentation for daily routines and a formal team collaboration system to report work progress were reviewed as the factors of knowledge externalization in previous studies. For this reason, they may reduce the tacit and complex nature created in knowledge processes. Hypothesis 4.5 and 4.6 regarding these factors were tested to investigate what affects the tacit and complex nature of

knowledge in the externalization process. Questionnaire items regarding the externalization process of knowledge were 1B-1, 1B-2, and 1B-3. When reliability analysis was performed with these three items, the correlation value of *written documentation for daily routines* (1B-3) was too low and the Cronbach's alpha value significantly increased when the item was deleted. *A formal team collaboration system for work progress reporting* (1B-1) and *modelling of concepts and ideas required for a project* (1B-2) are correlated in forming acceptable reliability as described in Table 4.4. It is notable for the test result to show that two items indicate the same thing. They superficially look different but qualitative analysis reveals a causal connection between them. A critical factor is *frequent group discussion* in the collaboration system and for modelling. Both of a *formal team collaboration system* and *modelling of concepts and ideas* can be regarded as *group processes*.

Reliability Analysis – Scale (Alpha)
Correlation Matrix

N = 558

	1B-1	1B-2	Alpha if Item Deleted
1B-1	1.000		None
1B-2	.599	1.000	None

- Reliability Coefficients: 2 Items
- Alpha = 0.749, Standardized Item Alpha = 0.749

Table 4.4. Reliability Analysis – Externalization

Test results in Table 4.5 reveal that marketing employees fulfil written documentation more frequently for daily routines. In contrast, R&D employees report work progresses through a team collaboration system, using experiment equipment and devices. Modelling concepts and

ideas is more frequent in R&D as well because it is *a collaborative group process* as mentioned above. These results mean that marketing project teams prefer *individual written reporting* based on daily routines, whereas R&D project teams prefer *group reporting* on the basis of advanced results.

R&D employees answered to an interview question about work reporting as follows:

> We have a weekly plan and a monthly plan. But we normally report something when we have new outcomes. Sometimes, we use PPT slides to show outputs but often present team outcomes to other people directly (MNC 4C-3).

> The monthly outcome is most important. It is shared with project members in a face-to-face meeting (MNC 1C-2).

> Reporting outcomes? Formally? I do not think we do that very often. We do that when necessary. To review it, evaluate it, and improve it on the basis of comments (pause). We report outcomes (MNC 2C-2).

On the other hand, marketing employees answered that:

> We have a formal reporting system and thus report what we do to a team leader daily (MNC 3D-2).
>
> We have to report what we have done, on Monday (pause) and what we will do, on Friday (MNC 4D-3).
>
> There are a lot of work reportings. I need to report my progress very often to a team chief (MNC 1D-2).

In a cooperative group work structure, it is difficult for employees to report daily routines almost every day. Reporting outcomes on *a weekly basis or monthly basis* when there is a critical progress can be more effective in this case. Knowledge outcomes become explicit in both cases of R&D and marketing. However, a causal factor that affects tacit and explicit nature in R&D and marketing reporting structures is gained from qualitative analysis. It is the *written reporting interval* of work progress in a specific project. When the interval is lengthened, verbalized ideas and applicative solutions in team discussion easily get lost. This situation can bring about *causal ambiguity* and thus tacit nature in R&D knowledge. Additionally, team collaboration and group discussion result in the increase of face-to-face co-work and more socialization. R&D reporting thus creates more tacit nature through cooperative team relationships even though R&D project outcomes are very explicit.

		N
Function	R&D	278
	Marketing	280

H 4.5 to H 4.6	$\sigma_1^2 = \sigma_2^2$		*t*	*df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Documentation of Daily Routines (Q'naire *1B-3)*	.057	Assumed	9.023	556	.000	R&D	3.05	.528	.821
						MKTG	3.73		
Collaborative Progress Reporting (Q'naire *1B-1)*	.012	Not assumed	-6.052	540.702	.000	R&D	3.70	-.645	-.329
						MKTG	3.21		
Modelling of Concepts and Ideas (Q'naire *1B-2)*	.632	Assumed	-8.736	556	.000	R&D	3.54	-.880	-.557
						MKTG	2.82		

Table 4.5. Univariate Effects of Functional Groups (at $p < 0.05$ level) – Externalization

4.3.2.2 Procedural Clarity and Ambiguity in Work Progress Reporting

My research addresses a question about why the marketing reporting structure is linked to relatively less frequent face-to-face co-work and group discussion. To solve this, it is necessary to look into marketing reporting structures carefully. Instead of minimizing face-to-face meetings across teams in the knowledge process toward a final outcome, work outputs in each process of a marketing project must be written and reported well to be able to be used in a preceding process. Interview results reveal that a knowledge outcome in a step is informative for the next step. For example, when a marketing plan and event organising for a new product is required, the market research team firstly identifies who the target customers are and how the product is positioned. Then the product road mapping (PRM) team builds a main strategy and plans using information from the market research team. The branding team builds a product identity on the basis of directions from

the PRM team. The event organising team makes a plan for events to present the product identity in an effective way after that.

Written documentation based on daily work becomes more important in this continuous work structure. A point to note here is that written documentation results in codified knowledge (Hansen, 1999). Marketing knowledge as a project outcome, unlike marketing know-how, is more regularly documented, whereby it becomes more explicit and knowledge complexity is moderated. On the other hand, R&D manuals that explain connections between sub-technologies are not documented in full but are selectively documented under the necessity time after time. Although data in R&D are easily stored as electronic files, fully documenting technological application processes is apt to be difficult because relatively a lot of technological trials and errors happen in an R&D project. A relatively big portion of application processes is transformed to technical skills and know-how rather than widely-shared written reports. Knowledge development processes are more standardized in marketing because unpredictable development errors are relatively small in number. *Procedural ambiguity* is thus lower in the development of marketing knowledge and explicitness is added into knowledge through the written documentation of the marketing reporting structure. This issue is relevant to task interdependence and thus must be more discussed afterwards.

4.3.3 External Partners as Necessary Knowledge Providers

4.3.3.1 Survey Results

MNC subsidiaries source some necessary knowledge from external organisations in their foreign countries for projects. Knowledge complexity can become higher or lower according to what types of knowledge are acquired and how they are acquired. Lam (2003) reviews relationships between foreign subsidiaries and external institutions in relation to the tacit and explicit nature of knowledge. Models presented by Lam (2000) are applied into the US and Japanese MNCs on the basis tacit and explicit nature that result from relationships with academic institutions (Lam, 2003). However, academic institutions reveal a mere part of external knowledge sourcing and thus other external sources have not been reviewed. Hypothesis 4.7 was tested to explore types of external sources involved in a project. Its six sub-hypotheses deal with a supplier (2A-1), a buyer (2A-2), an external agency (2A-3), an academic institution (2A-4), another subsidiary (2A-5), and any other local partner (2A-16). These items have been derived from previous studies and test results in Table 4.6 show what of them provides MNC R&D and marketing subsidiaries with information necessary for a project.

According to test results seen in Table 4.6, the combination of knowledge including classification, reuse, adding, and transformation (1C-1) occurs more frequently in R&D. This result indicates a possibility that *more team relationships* are created in the knowledge combination process because different knowledge units developed by multiple teams must join together. Internal team relationships and additional

relationships with external networks are not distinguished in the result. Regarding information from external networks, R&D is greater than marketing in a supplier, an academic institution, and any other local partner. Marketing is, in contrast, greater than R&D in a buyer, an external agency, and another subsidiary. These results mean that R&D project teams mainly gain external knowledge from a supplier, an academic institution, or some other local partners. On the other hand, marketing project teams mainly source external knowledge from a buyer, an external agency, or another subsidiary.

		N
Function	R&D	278
	Marketing	280

H 4.7	$\sigma_1^2 = \sigma_2^2$		*t*	*df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Supplier (Q'naire *2A-1)*	.032	Not assumed	-4.650	551.539	.000	R&D	3.16	-.499	-.203
						MKTG	2.81		
Buyer (Q'naire *2A-2)*	.015	Not assumed	7.261	544.003	.000	R&D	2.72	.413	.719
						MKTG	3.29		
Agency (Q'naire *2A-3)*	.739	Assumed	5.254	556	.000	R&D	2.90	.264	.580
						MKTG	3.32		
Academic Inst. (Q'naire *2A-4)*	.002	Not assumed	-11.939	547.636	.000	R&D	3.54	-1.177	-.845
						MKTG	2.53		
Subsidiary (Q'naire *2A-5)*	.429	Assumed	8.424	556	.000	R&D	2.77	.519	.834
						MKTG	3.45		
Local Partner (Q'naire *2A-6)*	.402	Assumed	-3.397	556	.001	R&D	3.32	-.387	-.103
						MKTG	3.08		
Combined Info. (Q'naire *1C-1)*	.000	Not assumed	-6.105	539.794	.000	R&D	3.85	-.650	-.334
						MKTG	3.36		

Table 4.6. Univariate Effects of Functional Groups (at $p < 0.05$ level) – Combination with External Partners

4.3.3.2 Tacit Nature in Cooperation with External R&D Networks

What these facts mean in relation to knowledge explicitness has been explored through interview results. R&D subsidiaries enter a

technical partnership with a supplier, an academic institution, or some other research institutes. At this point, an academic institution and some other research institutes have also a similar role with what suppliers must do. They supply a technological component for a specific final product such as software modules. This case is thus the *forward shift of information* from a supplier to an MNC in a supply chain. A co-work structure in this forward shift reveals *very close relationships* between a supplier and an MNC. Knowledge from those external networks mostly comes through face-to-face technical supports rather than documented indirect communications. Knowledge explicitness is added into combined knowledge through codded information sharing at this time. However, tacit nature is also added into knowledge through their social relationships accompanied by undocumented practical examinations. This fact means that the MNC will not be able to capture and store all technical applications tried out during their co-work sessions. Knowledge complexity increases in this cooperative combination process due to their unrecorded technical trials.

The case of marketing subsidiaries is different from that of R&D subsidiaries. Marketing knowledge that comes from a buyer, an external agency, or other adjacent subsidiaries[10] is delivered in a type of written reports rather than in-person supports. At this time, marketing employees do not closely work together with external agencies such as advertisement agencies and market research firms. This is just a

[10] Marketing project teams tend to share information with teams in neighbouring subsidiaries. e.g. a UK subsidiary linked to subsidiaries in Italy and France

commercial contract to provide an informative report for the MNC and make a payment to the agency. Information from buyers and adjacent subsidiaries is regarding market needs required for targeting customers. It thus indicates the *backward shift of information* from customers to an MNC in a supply chain. These types of information sourcing do not form a close partnership for cooperative work. Knowledge explicitness increases and knowledge complexity decreases in this case. This is due to the knowledge combination process through written reports. In sum, the forward shift of knowledge in the supply chain creates additional face-to-face relationships in R&D projects. On the contrary, the backward shift of knowledge in the supply chain results in the accumulation of explicit information informative for marketing projects.

4.3.4 Task Interdependence and Task Leadership in MNC Projects

4.3.4.1 Survey Results

This section examines differences between R&D and marketing teams regarding Hypothesis 4.8 and 4.9. Hypothesis 4.8 looks at a distinction between preceding and succeeding roles that minimizes joint duties and outcomes in a project. Hypothesis 4.9 deals with the attention level of team leaders into members in managing project matters as task leadership. Firstly, task interdependence addressed by Thompson (1967) originally indicates how different departments or some other level units in an organisation rely on others regarding performance. As an extension of this relation in an organisation, task interdependence has been

explored further in MNC studies, focusing on subsidiary-HQ relations (Johnston, 2005). The next chapter of my research investigates task interdependence between MNC subsidiaries and HQ. This chapter focuses on task interdependence between subsidiary teams because it wants to explore explicit or tacit nature created by interdependence in the knowledge creation process and local team relationships. Task interdependence reveals relationships between members in a self-managing team that has multiple roles and tasks (Langfred, 2007). If multiple teams or smaller work groups work together for a project, task interdependence among them, which have different roles, can occur in the same method. The different levels of task interdependence may shape distinctive local team relationships in R&D and marketing projects.

The test result of Hypothesis 4.8 reveals that the degree of task interdependence between project work groups is higher in R&D than in marketing as described in Table 4.7. This fact means that an outcome of one work group seriously affects an outcome of the other group because these two groups have to cooperate when different technologies from them must function together in the knowledge creation process. A complete R&D outcome consists of several knowledge components and thus putting them together needs repetitive trials through cooperation across teams. These repetitive technical errors and trials appear as a critical cooperative group process in R&D. Hypothesis 4.9 regarding task leadership dealing with project matters was also tested as seen in Table 4.7. According to the result, team leaders in marketing have more careful

interactions with members regarding project matters. Firm leaders in R&D, in contrast, tend to throw the reins to project members in achieving consensus on technical issues. These facts mean that *task leadership* is more critical in marketing teams. The reason is related to team task interdependence and thus more explored in the following section with interview results.

		N
Function	R&D	278
	Marketing	280

H 4.8 to H 4.9	$\sigma_1^2 = \sigma_2^2$		*t*	*df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Role Distinction (Q'naire *3A-1)*	.637	Assumed	6.445	556	.000	R&D	2.57	.394	.740
						MKTG	3.14		
Task Leadership (Q'naire *3A-2)*	.792	Assumed	2.808	556	.005	R&D	3.43	.060	.341
						MKTG	3.63		

Table 4.7. Univariate Effects of Functions (at $p < 0.05$ level) – Task Interdependence

4.3.4.2 A Link between Task Interdependence and Task Leadership

In terms of autonomy and the management of tasks, interview data supported the survey findings. R&D respondents reported more individual autonomy. When interviewees were asked who mainly manages their work, R&D employees answered:

> Who manages my tasks? It is me, of course. And I perform them with other team members in a lab (MNC 1C-3).

> My team head roughly manage tasks. But he focuses more on helping me work more easily in a good environment (MNC 3C-1).

> The team leader does not order many things. Under a brief guideline, we do most things (MNC 4C-3).

> We always work together. Team leader? He comes sometimes (MNC 2C-1).

On the other hand, marketing employees commented on the importance of team leaders in projects as illustrated by the following comments:

> We sometimes experience issues between teams/team members due to communication gaps. I think we need to have a better communication system with other teams. Anyway, now (pause), team leaders manage the issue and they order new tasks or something else to team members afterwards (MNC 3D-1).

> Tasks? You mean my work in the project. Well, my team head manages them (MNC 4D-2).

> For example, when a new LED TV is launched in a market, several teams are involved for market research, advertisement,

> event planning for F1 grand prix (pause) um (pause), and building marketing stuff. Team leaders organise the co-work. Assigning tasks to their team members, requesting something to another team, and so on (MNC 2D-2).
>
> The team leader tells me what I exactly need to do in the project. I report my output to him daily (MNC 1D-3).

As a result, a causal tree by qualitative analysis reveals that there is a link between task interdependence and task leadership. Task interdependence between subsidiary work groups[11] must be investigated further to view the causal link. On the basis of qualitative analysis results, sequential interdependence primarily occurs between marketing project work groups. The output of a work group becomes the input of another for the taskforce (TF) project. For example, when an MNC in the electronics industry designs an event project to expose its LED technology and brand name in a sport game, the output of a branding team is used in PR and marketing materials teams. Then the outputs of PR and marketing materials teams are used in the event organising team. Accumulated knowledge moves from the branding team to the event organising team in turn. An outcome of the branding team influences an

[11] Work groups in subsidiaries are normally recognized as teams, but smaller work groups for technical modules exist in each team in the case of automobile R&D subsidiaries.

outcome of the PR team but the latter outcome does not affect the former outcome much.

On the other hand, reciprocal interdependence occurs more frequently between R&D project work groups. A group output and another group output affect each other, and outputs from different groups bilaterally move in the R&D project structure. This is because a group output must be modified to be fitted in another group output later. R&D processes for developing new ICT products or cars can be the examples. R&D technicians for both products work in frequent interactions with the technicians of other groups. Several data have to be shared and changed at this time so that different technologies may function together in a product. When a problem arouses in a development process, R&D project teams tend to put their heads together in a laboratory. In contrast, each of the marketing project teams may request help to each other but generally solves a problem related to its own output by itself. When a taskforce is formed, different roles are assigned to project members from different teams in marketing. Each role is more independently performed on the basis of their clear work routines in marketing, compared with R&D.

There is a reason why task leadership, which means careful attention of team leaders into project matters undergone by team members, is treated with task interdependence in knowledge creation. Qualitative results show that marketing and R&D teams treat disagreed issues differently. R&D team members have relatively less disagreement

or immediately resolve disagreement in direct communications due to their face-to-face work styles. Their reciprocal interdependence makes such a face-to-face solution possible between R&D work groups. In this case, R&D leaders pay more attention to the work environment and convenience of team members. *Maintenance leadership* of Gladstein (1984) is thus needed to manage these working conditions. However, team leaders need to organise different opinions carefully in a marketing taskforce because project members usually work independently in separated places based on different routine teams. *Task leadership* is thus required in marketing teams to solve task-related problems. As a result, marketing team leaders are more involved in improving understanding between teams as a messenger for better communication. Task leadership thus becomes more critical when task interdependence between teams decreases. Team leaders have more roles as coordinators for trouble-shooting across teams in this case.

4.3.5 Multivariate Effects of Selected Dependent Variables

4.3.5.1 Functional Groups Interacted with Industrial Sectors

Nine hypotheses were tested to investigate the difference between R&D and marketing teams in knowledge creation activities and team relationships. My research wanted to additionally look into multivariate effects of some critical dependent variables as a follow-up. The interactive effects of multiple independent variables could also be observed by adding another categorical variable of industrial sectors.

Some of the items tested above were selected for the multiple-multivariate analysis. Selected items were factors that revealed significant effects on the basis of results gained through preliminary analysis. The effect of team size has also been investigated in comparing when it is controlled with when it is not controlled by using multi-way MANOVA and multi-way MANCOVA. Sectors (ICT or automobile industries) and functions (R&D or marketing) were two categorical independent variables at this time. Five dependent variables were selectively employed for these analyses as mentioned above. *Team size* was controlled as a covariate in the multi-way MANCOVA model.

		N
Function	R&D	278
	Marketing	280
Industry	ICT	368
	Automobile	190

DV	IV			*df*	Mean Square	*F*	Sig.	Effect Size
	Variables	Alternatives	Mean					
Participation in Informal Activities (1A-2)[12]	Function	R&D	3.44	1	81.023	87.217	.000	.136
		Marketing	2.70					
	Industry	ICT	3.06	1	.928	.999	.318	.002
		Automobile	3.08					
	F. X I.[13]	ICT-R&D	3.40	1	4.349	4.681	.031	.008
		Auto-R&D	3.50					
		ICT-Marketing	2.78					
		Auto-Marketing	2.50					
Team Work Structures to Support Informal Activities (1A-3)	Function	R&D	3.53	1	81.010	93.909	.000	.145
		Marketing	2.80					
	Industry	ICT	3.18	1	2.553	2.959	.086	.005
		Automobile	3.14					
	F. X I.	ICT-R&D	3.51	1	5.466	6.337	.012	.011
		Auto-R&D	3.57					
		ICT-Marketing	2.91					
		Auto-Marketing	2.55					
Interactions across Teams (1A-9)	Function	R&D	3.51	1	66.111	75.267	.000	.120
		Marketing	2.84					
	Industry	ICT	3.23	1	8.854	10.080	.002	.018
		Automobile	3.06					
	F. X I.	ICT-R&D	3.59	1	.769	.876	.350	.002
		Auto-R&D	3.40					
		ICT-Marketing	2.94					
		Auto-Marketing	2.59					
Modelling of Concepts and Ideas (1B-2)	Function	R&D	3.54	1	73.713	78.521	.000	.124
		Marketing	2.82					

[12] Please use the number to find the item from the attached survey questionnaire.
[13] Function by Industry Interaction

	Industry	ICT	3.14	1	.013	.013	.908	.000
		Automobile	3.25					
	F. X I.	ICT-R&D	3.46	1	3.988	4.248	.040	.008
		Auto-R&D	3.65					
		ICT-Marketing	2.87					
		Auto-Marketing	2.70					
Clear Role·Task Distinction without Joint Duties (3A-1)	Function	R&D	2.57	1	49.819	46.444	.000	.077
		Marketing	3.14					
	Industry	ICT	2.89	1	.144	.135	.714	.000
		Automobile	2.77					
	F. X I.	ICT-R&D	2.67	1	6.461	6.023	.014	.011
		Auto-R&D	2.41					
		ICT-Marketing	3.08					
		Auto-Marketing	3.28					

R Squared Values of Type III Sum of Squares in the Corrected Model		
.137 (Adjusted .133)	.146 (Adjusted .141)	.131 (Adjusted .127)
.128 (Adjusted .123)	.080 (Adjusted .075)	
Described in the order of dependent variables mentioned above.		

Table 4.8. Multivariate Effects (at $p < 0.05$ level) – Local[14]

The multivariate test results with and without a covariate are described in Table 4.8 and 4.9. The tables show the effects of functional groups interacted with industrial sectors on *participation in informal activities* (1A-2), *a team work structure to support informal activities* (1A-5), *interactions across teams* (1A-9), *modelling of concepts and ideas* (1B-2), and *a clear role and task distinction without joint duties* (3A-1). The foremost three of dependent variables were previously tested as *Informal Activity 2*, *Formal Activity 2*, and *Formal Activity 6*. Above all, all of the functional effects, which indicate differences between R&D and marketing, are significant like the test results of previous hypotheses. Some causal factors for clarifying these results were explained in previous sections. The effects of industrial sectors and functional groups interacted with industrial sectors, however, are not significant for all dependent variables

[14] Sum of Squares has not been reported separately on this table because it is the value of Mean Square multiplied by the degree of freedom (df). Each Sum of Squares is greater than each df and thus a significant difference exists.

at the 5% level (α = 0.05). Some results significant in Table 4.8 become insignificant in Table 4.9 and the reason is discussed in this section.

		N
Function	R&D	278
	Marketing	280
Industry	ICT	368
	Automobile	190

DV	IV			*Df*	Mean Square	*F*	Sig.	Effect Size
	Variables	Alternatives	Mean					
Participation in Informal Activities (1A-2)	Covariates	Team Size		1	3.262 3.246	3.691 3.520	.055 .062	.007 .006
		Home		1	23.604	26.710	.000	.046
	Function	R&D	3.44	1	71.599 66.193	81.021 71.576	.000 .000	.128 .125
		Marketing	2.70					
	Industry	ICT	3.06	1	.016 1.692	.018 1.830	.894 .177	.000 .003
		Automobile	3.08					
	F. X I.	ICT-R&D	3.40	1	4.598 2.969	5.203 3.211	.023 .074	.009 .006
		Auto-R&D	3.50					
		ICT-Marketing	2.78					
		Auto-Marketing	2.50					
Team Work Structures to Support Informal Activities (1A-3)	Covariates	Team Size		1	1.975 1.966	2.360 2.284	.125 .131	.004 .004
		Home		1	13.800	16.484	.000	.029
	Function	R&D	3.53	1	72.098 68.016	86.116 79.028	.000 .000	.135 .125
		Marketing	2.80					
	Industry	ICT	3.18	1	.849 3.399	1.014 3.949	.314 .047	.002 .007
		Automobile	3.14					
	F. X I.	ICT-R&D	3.51	1	5.586 4.179	6.672 4.855	.010 .028	.012 .009
		Auto-R&D	3.57					
		ICT-Marketing	2.91					
		Auto-Marketing	2.55					
Interactions across Teams (1A-9)	Covariates	Team Size		1	1.691 1.682	1.992 1.918	.159 .167	.004 .003
		Home		1	16.173	19.046	.000	.033
	Function	R&D	3.51	1	59.437 55.380	69.994 63.155	.000 .000	.113 .102
		Marketing	2.84					
	Industry	ICT	3.23	1	4.589 10.070	5.404 11.484	.020 .001	.010 .020
		Automobile	3.06					
	F. X I.	ICT-R&D	3.59	1	.957 .393	1.127 .448	.289 .504	.002 .001
		Auto-R&D	3.40					
		ICT-Marketing	2.94					
		Auto-Marketing	2.59					
Modelling of Concepts and Ideas (1B-2)	Covariates	Team Size		1	1.697 1.692	1.824 1.805	.177 .180	.003 .003
		Home		1	4.971	5.345	.021	.010
	Function	R&D	3.54	1	64.260 62.052	69.090 66.196	.000 .000	.111 .107
		Marketing	2.82					
	Industry	ICT	3.14	1	.144 .022	.155 .023	.694 .879	.000 .000
		Automobile	3.25					
	F. X I.	ICT-R&D	3.46	1	3.675 2.984	3.951 3.183	.047 .075	.007 .006
		Auto-R&D	3.65					
		ICT-Marketing	2.87					
		Auto-Marketing	2.70					
Clear Role·Task Distinction without Joint Duties (3A-1)	Covariates	Team Size		1	.116 .117	.108 .109	.742 .742	.000 .000
		Home		1	.850	.791	.374	.001
	Function	R&D	2.57	1	47.880 47.215	44.548 43.946	.000 .000	.075 .074
		Marketing	3.14					
	Industry	ICT	2.89	1	.415 .194	.386 .180	.535 .671	.001 .000
		Automobile	2.77					
	F. X I.	ICT-R&D	2.67	1	6.932 6.562	6.449 6.107	.011 .014	.012 .011
		Auto-R&D	2.41					

		ICT-Marketing	3.08					
		Auto-Marketing	3.28					

R Squared Values of Type III Sum of Squares in the Corrected Model		
.182 (Adjusted .175)	.174 (Adjusted .167)	.163 (Adjusted .156)
.143 (Adjusted .137)	.149 (Adjusted .143)	.134 (Adjusted .128)
.139 (Adjusted .131)	.082 (Adjusted .073)	
.130 (Adjusted .124)	.080 (Adjusted .074)	
Described in the order of dependent variables mentioned above.		

Table 4.9. Local – Control of Team Size and Home Countries (at $p < 0.05$ level)

The factors of home countries (Western or Eastern) and team size are set as control variables for MANCOVA in Table 4.9. Except home countries (countries of origin), each factor has two different values in the cells of Table 4.9. Lower values indicate multivariate effects when team size alone is controlled. Upper values reveal multivariate effects when both team size and home countries are controlled. As seen in the table, the difference of home countries does not affect the effects of functions on dependent variables. It means that the statistical significance of the effects is not changed at all. In addition, the effects of functions by industry interaction and industrial effects are not affected by home control seriously. For this reason, functional effects are significant regardless of home countries. The effects of R&D and marketing on local features are significant beyond home country effects. However, this fact does not mean home country effects on dependent variables are not significant. This research mainly explores functional effects on dependent variables, controlling home countries and team size. The direct effects home countries on local features are not tested in this MANCOVA. Home

country effects on dependent variables are briefly introduced in the discussion section.

The gist of what statistics in above two tables indicate is as follows. First, the effect of functional groups interacted with industrial sectors on *participation in informal activities* is greatest in automobile R&D subsidiaries. However, the effect on this variable disappears when team size is controlled as seen in Table 4.9. This result means that automobile R&D subsidiaries have the more active participation of employees in informal activities than ICT-R&D, ICT-marketing, and automobile-marketing do, but *team size* affects the result. The teams of automobile R&D subsidiaries have relatively many employees and thus are bigger. Big-sized teams get employees actively involved in informal activities according to the statistic. Second, the effect of functional groups interacted with industrial sectors on *team work structures to support informal activities* is also the greatest in automobile R&D subsidiaries and this effect still appears even when team size is controlled. An industrial effect on the same variable (ICT > automobile) is not statistically significant in Table 4.8, but it becomes significant when team size is controlled. An industrial effect on the team supporting structure previously-hidden by team size is revealed at this time. Third, the industrial effect on *interactions across teams* is greater in the ICT industry than the automobile industry. This result is not changed and still significant even when team size is controlled.

Those three are socialization factors in the knowledge creation process, whereas the next two factors treat externalization and task interdependence. Fourth, the effect of functional groups interacted with industrial sectors on *modelling of concepts and ideas* is the greatest in automobile R&D subsidiaries. The externalization of knowledge itself is thus more strengthened in automobile R&D subsidiaries, compared with other subsidiaries. However, this effect disappears when team size is controlled as seen in Table 4.9. Therefore, there is an influence of team size, and modelling of concepts and ideas becomes more frequent when team size is bigger. Fifth, *a clear role and task distinction without joint duties* appears the most in automobile marketing subsidiaries, irrespective of *team size*. When only R&D subsidiaries are observed, ICT-R&D employees have clearer roles and tasks than automobile-R&D employees do. Finally, the coefficients of both MANOVA and MANCOVA models do not have enough explanatory power (R^2), so it is not very necessary to compare levels explained by dependent variables.

4.3.5.2 Clarification of Interactive Effects between Two Categories

Reasons why above five phenomena distinctively arise in functional groups and industrial sectors have to be more explored with qualitative analysis. First of all, above test results showed that employees in big-sized teams are better involved in informal activities. Subsidiaries with bigger teams tend to have more *alternatives* and *avocation societies* for informal activities such as sports, climbing, meals, parties, films,

music and other spare time activities. Moreover, solidarity between team members becomes higher in bigger teams because of the easiness of *building team identity*. Small-sized teams tend to merge more easily into each other or change their group objectives. This structure prevents small-sized teams from a distinctive sense of team identity. These are the reasons why employees in automobile R&D subsidiaries participate more actively in informal socialization activities with team members.

Regarding the second finding, the question is why an industrial effect is greater in ICT than in automobile even though the interaction effect of functional groups and industrial sectors is the greatest in automobile-R&D. The answer is not very hard and this issue is an optical illusion caused by simply thinking about the interactive effect multiple categorical variables. The mean of ICT is 0.36 higher than the mean of automobile in marketing. However, the mean of ICT is 0.06 lower than the mean of automobile in R&D. The difference in marketing is bigger than the difference in R&D, so ICT is eventually higher. Effects on the second variable correspond to each other even though statistics look odd as a result. More importantly, there is a reason why the level of *team work structures to support informal activities* is the highest in automobile R&D subsidiaries. Team size does not affect the result as seen in tables but a *yearly budget* is linked to the supporting structure because the amount invested in automobile R&D is the highest and this *financial affluence* increases payments for socializing events and other employee benefits. Most automobile-R&D and ICT-R&D subsidiaries financially support much

more for spare time activities of employees, compared with marketing subsidiaries.

The third finding was more frequent interactions occurred across teams in the ICT industry rather than the automobile industry. This is because teams in automobile subsidiaries work more independently from other teams but more dependently with internal team members. For example, a transmission R&D team is connected with an engine R&D team, but technical trials and errors in their cooperative work for technical outcomes combined to function together are minimized. Two teams perform technical developments following a stricter guideline in order to prevent a big loss in *R&D time and costs* caused when the transmission and the engine are a mismatch. Instead, there are more development modules for a transmission or an engine in each team, so more interactions for a match of intra-team modules occur in each team. In other words, ICT teams have more *inter-team interactions*; in contrast, automobile teams have more *intra-team interactions*.

In the next finding, more frequent practices for modelling of concepts and ideas in bigger teams were previously indicated. Two questions are why these modelling practices occur more often in bigger teams and how these practices influence the tacit and explicit nature of knowledge in automobile-R&D and ICT-R&D subsidiaries. Firstly, a causal factor that determines the modelling frequency is *the amount of knowledge components* assigned to subsidiary teams. Knowledge

components mean sub-knowledge units that compose a final outcome. All different technologies required for final automobile and ICT products will be knowledge components created in R&D subsidiaries. Bigger teams normally have more knowledge components, so more conceptual models are created for the knowledge components. This was the reason why modelling of concepts and ideas clearly appeared in automobile R&D subsidiaries. In addition, Section 4.3.2 states that this modelling work adds tacit nature into knowledge in the increase of group discussion even though drawn models are very explicit in themselves. This tacit nature brings about the increase of knowledge complexity. Nevertheless, it is not apparent that knowledge complexity is higher in automobile-R&D than ICT-R&D. This is because interactions across teams, which are more frequent in ICT-R&D[15], are also critical for knowledge complexity.

Finally, there was a clearer role and task distinction, reducing joint duties, in automobile marketing subsidiaries. The next highest sectors were ICT-marketing, ICT-R&D, and auto-R&D in turn. The joint duties mean task interdependence between teams or smaller work groups. A reason why automobile R&D work groups have the highest task interdependence is relevant to the amount of knowledge components above-mentioned. Knowledge components result in more work modules and work groups are formed to develop these modules. Automobile R&D subsidiaries have much more work modules and duties for them. These

[15] The survey result shows that this fact is not significant at the 5% level but interview results consistently indicate very frequent interactions across teams in ICT-R&D.

modules have to function together at the last and thus work groups are given more cooperative duties. There is a difference between automobile-R&D and ICT-R&D in forming work groups. Automobile R&D teams have intra-team work groups for a specific project. The teams normally take a responsibility for multiple modules in a project and thus small work groups for modules exist in each team. On the other hand, ICT R&D teams usually take a responsibility for the only one module in each project.[16] For this reason, joint duties and task interdependence appear as cooperative tasks between different teams in ICT R&D. When observation is limited in marketing, task interdependence in ICT-marketing is higher than that in automobile-marketing. This is because ICT marketing often performs short-term projects which involve a few team members for the same duty; however, automobile marketing often does long-term projects in which a team member independently works for a duty. Main findings of this chapter are described in Table 4.10 and they are discussed further in the next section.

	R&D		Marketing	
	ICT	Automobile	ICT	Automobile
Inter-Team Socializing	Highest	High	Low	Lowest
Intra-Team Socializing	High	Highest	Low	Lowest
Task Interdependence	High	Highest	Low	Lowest
Face-to-Face Work	High	Highest	Low	Lowest
Work Reporting Type	Collaborative Reporting on the Weekly or Longer Basis		Individual Reporting on the Daily or Weekly Basis	
Co-Work with External Partners	Close Partnership		Commercial Contract	
Leadership Style	Maintenance Leadership		Task Leadership	
Application Skills & Know-How	High		Low	

[16] An ICT R&D team can also develop multiple modules at the same period but this fact means that the team is involved in multiple projects. It does not mean that the team develops multiple modules for a specific project in most cases.

Added into Procedural Trials		
Ties between Work Groups	Strong	Weak
Explicitness of Work Outcomes	High	High
Knowledge Complexity	Medium-High	Low

Table 4.10. Summary of Findings – Local Team Relationships

4.4 Discussion

This chapter addresses task interdependence and knowledge complexity in the knowledge creation process of MNC subsidiaries on the basis of team relationships, team activities, and knowledge explicitness. A question can arise at this point: What is the relation between task interdependence and knowledge complexity? It is obvious that most large MNCs reveal pooled interdependence, sequential interdependence, and reciprocal interdependence in the control of subunits (Thompson, 1967). The subunits can be teams in a subsidiary or subsidiaries in an MNC. Relevant studies after Thompson (1967) show what task interdependence does in MNCs. For example, it helps internal knowledge to be shared with other units in an MNC (Foss and Pedersen, 2004). However, where task independence is from or what facilitates it is still not clear. Its origin can be related to knowledge nature edged in new product development (Carlile, 2002). The evidence from my empirical data tells the story about the characteristics of R&D and marketing knowledge generated from the global projects of MNCs.

As described in Table 4.10, both of the work outcomes of R&D and marketing are explicit in well-systemized MNCs. Nevertheless, R&D knowledge as a final project outcome gets tacit nature because of the

procedural ambiguity based on unrecorded application skills and know-how and verbalized work communications. We can surely think that task interdependence (A) based on active interactions causes knowledge complexity (B). Complicated knowledge comes from inter-unit relationships (Kogut and Zander, 1992) and the changes of particular codes affect the complexity degree (Hansen, 1999). However, there is a question regarding whether the fact that *A causes B* is always true. Complex knowledge inevitably has much more causal links of knowledge components. Some of the links are ambiguous to be understood and thus let us believe that the knowledge is complicated. A key is that these causal links necessarily need reciprocal work processes to join together. Also, socializing and tacit nature are continuously created during the co-work process for causal links. A collaborative reporting system is not selective but necessary for an effective knowledge creation process for complicated knowledge.

What I want to say at this point is that when the relation between task interdependence (A) and knowledge complexity (B) is explained, the expression of *B causes A* can be better. This is due to one of the critical factors in the knowledge creation process, *procedural ambiguity and clarity*. This factor based on tacit skills and know-how is very important in the relation of task interdependence and knowledge complexity. The evidence reveals in differences between ICT S/W and ICT H/W as seen in Table 4.11. The level of both socialization activities and communications is higher in ICT S/W subsidiaries than ICT H/W

subsidiaries. For this reason, the ICT S/W sector has a higher possibility for more reciprocal task interdependence. Knowledge complexity, however, appears higher in ICT H/W than ICT S/W. These facts show that task interdependence does not always result in knowledge complexity. This is because procedural ambiguity and required tacit know-how are relatively small in ICT S/W. If a subsidiary has a clearer application process even though it has high team interdependence, knowledge complexity becomes lower.

		N
ICT	Software	53
	Hardware	315

Dependent Variables	*Df*	Mean Square	Effect Size	Industries	Means	*F*	Sig.
Team Work Structures to Support Informal Activities (Q'naire 1A-3)	1	5.292	.015	ICT S/W	3.47	5.716	.017
				ICT H/W	3.13		
Team Work Structures to Support Formal Activities (Q'naire 1A-6)	1	6.356	.018	ICT S/W	3.70	6.682	.010
				ICT H/W	3.32		
Interactions across Teams (Q'naire 1A-9)	1	4.085	.010	ICT S/W	3.49	3.876	.050
				ICT H/W	3.19		
IT-Informal (Q'naire 1D-1)	1	15.066	.029	ICT S/W	3.49	10.899	.001
				ICT H/W	2.91		
IT-Formal[17] (Q'naire 1D-2)	1	11.785	.035	ICT S/W	4.15	13.180	.000
				ICT H/W	3.64		

Table 4.11. Effects of ICT Alternatives (at $p < 0.05$ level) – Local

Finally, home country effects on local features are discussed further. As described in Table 4.12, home country effects on participation in informal activities, team work structures to support informal activities, interactions across teams, and modelling of concepts and ideas are

[17] ICT S/W is higher in IT communications both for informal talk and formal work, and this result is caused by higher web accessibility.

significant. The test result shows that Western companies are greater than Eastern companies in those factors. This fact means that Western companies are likely to have a close local team relationships, compared with Eastern companies. Empirical data is not enough to reveal the reason because this research has been designed for the comparison of R&D and marketing, controlling home country effects. However, Western companies are expected to have a more effective team communication system.

		N
Home	Western	209
	Eastern	349
Function	R&D	278
	Marketing	280

DV	IV			*Df*	Mean Square	*F*	Sig.	Effect Size
	Variables	Alternatives	Mean					
Participation in Informal Activities (1A-2)	Covariate	Team Size		1	4.230	4.818	.029	.009
	Home	Western	3.29	1	22.244	25.339	.000	.044
		Eastern	2.93					
	Function	R&D	3.44	1	55.067	62.730	.000	.102
		Marketing	2.70					
	H. X F.	Western-R&D	3.54	1	6.964	7.933	.005	.014
		Eastern-R&D	3.39					
		Western-Mktg.	3.08					
		Eastern-Mktg.	2.43					
Team Work Structures to Support Informal Activities (1A-3)	Covariate	Team Size		1	2.535	3.011	.083	.005
	Home	Western	3.33	1	14.089	16.734	.000	.029
		Eastern	3.07					
	Function	R&D	3.53	1	56.929	67.615	.000	.109
		Marketing	2.80					
	H. X F.	Western-R&D	3.64	1	2.907	3.453	.064	.006
		Eastern-R&D	3.48					
		Western-Mktg.	3.09					
		Eastern-Mktg.	2.61					
Interactions across Teams (1A-9)	Covariate	Team Size		1	1.400	1.637	.201	.003
	Home	Western	3.39	1	21.469	25.103	.000	.043
		Eastern	3.05					
	Function	R&D	3.51	1	61.606	72.033	.000	.115
		Marketing	2.84					
	H. X F.	Western-R&D	3.84	1	1.286	1.503	.221	.003
		Eastern-R&D	3.35					
		Western-Mktg.	3.02					
		Eastern-Mktg.	2.71					
Modelling of Concepts and Ideas (1B-2)	Covariate	Team Size		1	2.692	2.901	.089	.005
	Home	Western	3.25	1	3.732	4.021	.045	.007
		Eastern	3.14					
	Function	R&D	3.54	1	51.999	56.030	.000	.092
		Marketing	2.82					
	H. X F.	Western-R&D	3.52	1	4.035	4.348	.038	.008
		Eastern-R&D	3.55					
		Western-Mktg.	3.03					
		Eastern-Mktg.	2.68					

Clear Role·Task Distinction without Joint Duties (3A-1)	Covariate	Team Size		1	1.075E-006	.000	.999	.000
	Home	Western	2.85	1	.135	.127	.722	.000
		Eastern	2.85					
	Function	R&D	2.57	1	29.181	27.511	.000	.047
		Marketing	3.14					
	H. X F.	Western-R&D	2.77	1	14.124	13.315	.000	.024
		Eastern-R&D	2.47					
		Western-Mktg.	2.92					
		Eastern-Mktg.	3.28					

R Squared Values of Type III Sum of Squares in the Corrected Model		
.186 (Adjusted .180)	.168 (Adjusted .162)	.156 (Adjusted .150)
.139 (Adjusted .133)	.092 (Adjusted .085)	

Described in the order of dependent variables mentioned above.

Table 4.12. Effects of Home Countries (at $p < 0.05$ level) – Local

CHAPTER 5: EMPIRICAL STUDY 2

Control Structures between Foreign Subsidiaries and the MNC Headquarters (HQ) in Knowledge Transfer: Local Embeddedness and Subsidiary Autonomy

5.1 Introduction

The previous chapter investigated local team relationships in the knowledge creation process. This chapter differently focuses on cross-national control structures in knowledge transfer between MNC subsidiaries and HQ. Knowledge transfer in multinational companies has been studied vigorously for over ten years. One of the critical knowledge contexts is to link MNC headquarters to MNC subsidiaries (Almeida and Phene, 2004). Managing foreign subsidiaries is closely related to the success of MNC knowledge transfer (Björkman et al., 2004). My focus is on what aspects in relationships between MNC subsidiaries and HQ promote knowledge transfer when different functional subsidiaries are compared. It is inevitably connected to structural mechanisms that configure technological and non-technological knowledge processes. Relationships between MNC foreign subsidiaries and HQ in the knowledge

transfer process are thus valuable to be explored. These subsidiary-HQ relationships have been studied in some different perspectives. Subsidiary-HQ relationships are sometimes reviewed as bargaining relations for maximizing knowledge sharing in the view of agency theory (Mudambi and Navarra, 2004). The relationships are investigated in how to design an incentive structures for subsidiary managers (Gupta and Govindarajan, 2000). Two perspectives among them are popular in the MNC knowledge transfer literature: agency theory and socialization theory. The former regards foreign subsidiaries as agents that cause costs and the latter regards them as objects for integration. Coordinative control mechanisms employ these two perspectives (Cray, 1984) and my study reviews subsidiary-HQ relationships through this angle in terms of social embeddedness and autonomy control.

MNC management types for foreign subsidiaries have been studied particularly in the relationships between MNC subsidiaries and HQ. Lam (2003) reveals that US MNCs try to create globally integrated networks of R&D coordinated by project management with a considerable degree of autonomy of the local R&D organisations. On the other hand, the global R&D structure of Japanese MNCs is in a HQ-centred hub model with tight control over the local R&D units. Two terms, coordinated autonomy and participative centralization, reveals these characteristics. Previous studies that explore centralized and decentralized authority also reflect the autonomy degree. However, these studies do not care about what ranges of working processes require autonomy in local operation.

My curiosity is where the autonomy is placed in the operational parts of foreign subsidiaries. Coordinative mechanisms to reflect this issue and managerial strategy based on them must be studied (Martinez and Jarillo, 1991). Thus, this chapter aims at structuring cross-national control structures in knowledge transfer to explore how R&D and marketing organise them in terms of information dependence, knowledge sharing frequency, geographic proximity, knowledge transfer methods, and decision autonomy. My study specifically reveals how different types of autonomy are granted to subsidiaries as the second part of the whole research. Such a coordinative mechanism is closely linked to the local embeddedness of foreign subsidiaries, their dependence onto HQ, knowledge transfer methods, and local autonomy in decision-making.

5.2 Theoretical Framework and Hypotheses

5.2.1 Home and Local Embeddedness

Social embeddedness can be reviewed to address relationships between foreign subsidiaries and HQ. This is because it reveals relational structures between them such as centralized and decentralized systems. Social embeddedness in the knowledge transfer process of MNCs was initially linked to home environments. It is explained as a home country effect, which makes knowledge more centralized toward the headquarters. A parent corporation is embedded in social and business systems formed by the home country (Ferner, 1997; Lam, 1997; Pudelko and Harzing, 2007). Social embeddedness has been explored in host environments as

well and it is distinctively named as local embeddedness. Such a host country effect results from institutional perspectives that include local organisations and regulations. A foreign subsidiary in the host country is affected by institutional factors locally-shaped (Ferner, 1997; Lam, 2003; Rosenzweig and Nohria, 1994).

These two options can be purposeful; the former causes standardized and centralized knowledge transfer strategies toward parent firms (Harzing, 2000), while the latter results in localized and decentralized knowledge transfer strategies (Gupta and Govindarajan, 1991). The international business and management literature presents relevant models. Lam (2003) addresses the professional community model and the organisational community model. In the professional community model, overseas R&D units are closely connected with external networks and highly embedded in local innovation systems. In contrast, they are limitedly embedded in local systems and more centralized toward their parent firms in the organisational community model. They can be viewed similarly in the decentralized model and the network-based model as well (Malnight, 1996). Local embeddedness has been explored more specifically in relationships with local networks such as local customers, suppliers, and research institutions (Nobel and Birkinshaw, 1998; Rowley et al., 2000).

There is a curiosity regarding what of organisational factors results in above local embeddedness and home embeddedness. A point is that those models are determined *by the intention of MNCs such as*

international integration rather than by chance (Ferner, 2000). MNC intention means that MNCs make a necessary strategic choice for effective knowledge transfer. It will thus be critical to get an answer about what is the determinant of making foreign subsidiaries more locally-embedded or centrally-embedded toward the home country. This answer can be helpful for MNCs to set an appropriate knowledge transfer model as a result. Lam (2003) views intra-organisational proximity between a subsidiary and HQ as a factor that interferes with local embeddedness. This internal proximity is also linked to international integration indicated by Ferner (2000). At this point, a preliminary analysis of my interview data reveals that the necessity of intra-organisational proximity across countries results from subsidiary *dependence on HQ information*.

The qualitative results consistently indicate that subsidiary dependence on HQ data brings about local strategies controlled by the parent company[18]. This situation accelerates internal integration and coherence between a subsidiary and HQ. There is thus a possibility that subsidiary dependence on HQ information weakens the local embeddedness of foreign subsidiaries. Lam (2003) discusses intra-organisational proximity and local embeddedness in comparing Japanese and US R&D. Subsidiary dependence on HQ information is likely to be higher in Japanese subsidiaries because they reveal higher intra-organisational proximity. However, the study does not discuss the

[18] The control of local strategies is more investigated in the decision autonomy section of this chapter.

information dependence and the difference of such dependence may not be very distinctive in only R&D subsidiaries. Many ICT MNCs set an information barrier that protects confidential core technologies from rival firms. They thus open only necessary information even to foreign R&D subsidiaries. This structure makes R&D subsidiaries more dependent on the parent company because they cannot develop new outcomes without the necessary knowledge. This feature can appear similarly in US R&D as well as Japanese R&D in Lam's study even though the dependence levels are somewhat different. The difference of dependence levels on HQ information can be clearer between different functional subsidiaries rather than the same R&D.

H 5.1. There is a difference between R&D and marketing functions in subsidiaries in terms of their dependence on information from MNC headquarters.[19]

This chapter takes more interest in geographic proximity to local networks in MNC knowledge transfer. An MNC foreign subsidiary is simultaneously embedded in its internal parent company and in its external networks. This fact is based on the knowledge-based perspective that emphasizes the importance of both internal and external sources for a competitive advantage (Dyer and Singh, 1998; Gulati et al., 2000; Li, 2005). Dependence on home information stated above reveals *subsidiary-*

[19] To see why hypotheses in the chapter use 'a difference between' instead of the terms of 'greater than' or 'smaller than', please go to Footnote 35.

positioning based on the different use of *internal sources*. On the other hand, geographic proximity to local networks is expected to show *subsidiary-positioning* based on the different use of *external sources*. Geographic proximity is related to the local absorption of knowledge spillovers (Feinberg and Gupta, 2004; Hallin and Lind, 2012). This local absorption confined geographically may hinder home embeddedness and facilitate local embeddedness. Strong external knowledge networks based on spatial proximity can closely embed a firm in the local innovation system (Baregheh et al., 2009; Howells 2002; Lawson and Lorenz, 1999; Maskell and Malmberg, 1999). This fact is limited to R&D and thus it must be explored further in marketing as well as R&D. Testing the geographic proximity of MNC subsidiaries to local networks can thus help the clarification of subsidiary-HQ relationships.

H 5.2. There is a difference between R&D and marketing functions in subsidiaries in terms of the geographic proximity of local networks for a project.

5.2.2 HQ-Subsidiary Interaction and Use of Expatriates

The knowledge transfer literature views relationships between a subsidiary and its HQ as intra-organisational relationships and relationships between a subsidiary and its local networks as inter-organisational relationships (Li, 2005). This chapter focuses on the intra-organisational relationships in knowledge transfer. Previous section deals

with geographic proximity between a subsidiary and its local networks. This matter is, however, investigated to explore dependence on parent company rather than to review an effect of local networks. Subsidiary dependence on HQ information mentioned above creates a need for reviewing interactions between subsidiaries and HQ. A previous study by Noorderhaven and Harzing (2009) reviews HQ-subsidiary relationships such as formal coordination and subsidiary autonomy linked to knowledge flows between subsidiaries and HQ. The results show the *intensity of social interaction* between subsidiaries and HQ is positively related to knowledge flows between them. For this reason, how frequently subsidiary teams interact with HQ teams for knowledge sharing can be reviewed to clarify the cross-national team structures of knowledge transfer.

The intensity of social interaction is observed as the frequency of online and offline meetings for knowledge sharing. At this time, this cross-national interaction can be affected by expatriation types. The context of expatriation in knowledge transfer has been explored in many international management studies. Expatriation is often seen as an organisational capability that facilitates willingness to transfer knowledge (Minbaeva and Michailova, 2004). It can thus be a determinant of knowledge sharing effectiveness with some other factors (Argote et al., 2003). More importantly, it has been reviewed in the contexts of interunit interaction that influence knowledge sharing (Mäkelä and Brewster, 2009). Expatriation plays an important role for interaction and sharing levels as

a result. Expatriates, international working groups, and international assignments, which previous knowledge transfer studies have observed to review expatriation, are explored as knowledge transfer methods.

Expatriates are a type of transmission channel that bridges the gap between knowledge senders and receivers in foreign subsidiaries and HQ (Argote et al., 2003). However, the advancement of telecommunication technologies makes international assignments and cross-national groups more common in video or web conferences nowadays (Cummings, 2004; Kamoche, 1997). These international work types can be related directly to the level of knowledge sharing in minimizing the role of expatriates. The effect of expatriates on knowledge transfer becomes indistinct in subsidiaries that have been operated for over ten years (Fang et al., 2010). To investigate why this phenomenon occurs, three expatriation types mentioned above can be explored as knowledge transfer methods. My research samples are the subsidiaries of high-performed MNCs which have been operated for over ten years. Two relevant hypotheses are inductively extracted from preliminary analysis of interviews.

H 5.3. There is a difference between R&D and marketing functions in subsidiaries in terms of the frequency of interacting with MNC headquarters for knowledge sharing.

H 5.4. There is a difference between R&D and marketing functions in subsidiaries in terms of the methods for knowledge transfer with MNC headquarters.[20]

H 5.4.1. Expatriates.

H 5.4.2. International working groups.

H 5.4.3. International assignments.

5.2.3 Subsidiary Autonomy in Knowledge Transfer

Subsidiary autonomy indicates how HQ is involved in the activities of foreign subsidiaries and whether they are dependent on HQ or not. How autonomy is granted to MNC subsidiaries thus clarifies relationships between them and their HQ. It is specifically recognized as power relations between MNC subsidiaries and HQ. Corporate control over subsidiaries in their relations is also connected with knowledge flow patterns (Gupta and Govindarajan, 1991). Issues about the control and autonomy of MNC subsidiaries have been reviewed in terms of delegation, empowerment, autonomy, and discretion (Baliga and Jaeger, 1984; Edwards and Collinson, 2002; Ferner et al., 2004; Ferner et al., 2011). Notably, autonomy is limited to local operational issues in even subsidiaries decentralized from HQ. One of the reasons is standardization caused by the integrated global activities of the headquarters and it reduces the autonomy of foreign subsidiaries

[20] Three t-tests are separately performed for this hypothesis. In other words, it has three sub-hypotheses.

(Edwards et al., 2002). An indisputable fact is that subsidiary autonomy appears differently in the local operational system of foreign subsidiaries. The different appearance of autonomy in subsidiaries has been identified in some previous studies. They mainly focus on the degree such as an increase and a decrease of autonomy. Then such a degree is considered in some issues of control loss and dependence on HQ (Foss and Pedersen, 2002).

There are trials that present more developed factors from degrees itself in investigating the different appearance of autonomy. Operational managers in foreign subsidiaries are classified into four types: free agents, local managers, expatriate managers, and dual nationals (Mudambi and Navarra, 2004). Differences between them are based on the level of their loyalty to their parent companies and local subsidiaries. In this typology, an expatriate manager dispatched to hold down local autonomy shows higher loyalty to HQ than the subsidiary. The main interest here is how much autonomy MNC subsidiaries have for local operation. One of the popular terms, centralized and decentralized authority, also reveals how higher autonomy is granted to subsidiaries. The study of Kostova and Roth (2002) views subsidiary autonomy in a different angle focusing on how far subsidiaries accept what HQ regulates. Foreign subsidiaries adopt HQ practices differently under pressure from their parent company. Their adoption model may indicate autonomy types granted to subsidiaries but it is a top-down mechanism. In the more bottom–up view, delegation of decision-making rights to the knowledge

developers is explored (Ciabuschi et al., 2010). Different types of decision-making rights are developed through the following hypotheses constructed from interview results.

H 5.5. R&D and marketing functions in subsidiaries differ in terms of the levels of decision autonomy that they have from their parent company over local strategies.

H 5.6. R&D and marketing functions in subsidiaries differ in terms of the levels of decision autonomy that they have from their parent company over HR/Financial resources.

These six hypotheses have been set up from interview results and previous studies. Independent samples t-tests are performed to examine the hypotheses and these tests reveal the main findings of my research. Multivariate analysis supplements the findings in order to show more relevant effects and relationships.

5.3 Results

The previously-stated theoretical framework deals with three main themes: the home and local embeddedness of foreign subsidiaries, HQ-Subsidiary interaction and use of expatriates, and subsidiary autonomy in knowledge transfer. These themes are sequentially connected with each other rather than independent. Survey and interview

results reveal how home and local embeddedness is linked to subsidiary autonomy via cross-national interactions and use of expatriates. Tests of six hypotheses are the starting points and they indicate fundamental effects by the functional variation. Relationships between variables are more clarified through two different multivariate models. A survey questionnaire regarding variables was created from previous studies and initial interviews. The questionnaire survey and additional interviews were performed to investigate relationships between variables after that. They were analysed through valid quantitative and qualitative methods as described in the methodology chapter.

5.3.1 Subsidiary Dependence on HQ Information

Survey and interview data were analysed to investigate the difference between R&D and marketing functions in subsidiaries in terms of their dependence on information from MNC headquarters. A relevant hypothesis was thus tested in using the unpaired (independent samples) t-test [21] to compare binary variables, R&D and marketing. The result reveals that the dependence on information from MNC headquarters appears to be higher in R&D than in marketing. Descriptive statistics in Table 5.1 show that the mean of R&D (3.71) is greater than the mean of marketing (3.14). According to the result of a t-test in the Table, the difference between these means ($\mu 1 \neq \mu 2$) is statistically significant at the

[21] The type I error is checked through additional multivariate analysis to remove dependent variables that may not cause an actual difference of R&D and marketing

5% level ($\alpha = 0.05$). This fact means that R&D and marketing subsidiaries are significantly different in depending on information from their MNC headquarters. As mentioned previously through group statistics, the average value of R&D is greater than that of marketing. Therefore, we can conclude that R&D subsidiaries have more information dependency on HQ than marketing subsidiaries do.

This finding can be explored more toward what it means in the local embeddedness literature. Qualitative analysis from interview results also reveals that marketing knowledge is more oriented towards local information. Marketing subsidiaries tend to treat critical information more independently in order to target an assigned foreign market effectively.

Regarding the relationships with their parent companies, marketing employees said:

> We only focus on our local market and customers. My subsidiary has regular meetings with regional headquarters but normally higher-level managers or directors attend the meetings (MNC 3D-4).

> Market information and customer data are most important. And we often use agencies to get the information. We work with them (MNC 2D-4).

> One of our teams analyses market data and creates useful information for other teams. It is more than information given by our headquarters. If we come to play in a test market, we need to create and send information to the headquarters, and then the headquarter shares the information with other subsidiaries (MNC 1D-3).

When another question about the role of a test market was given, another person answered:

> When a new product is developed, it sometimes needs to be tested in a market or a few markets so that worldwide marketing plans can be built from the test market information. And (pause) (MNC 1D-4).

In contrast, an R&D employee talked about dependence on the parent company as illustrated by the following comments:

> Basic information and data come from the headquarters. We develop something new, using the data (MNC 1C-1).

Another interviewee commented in a similar vein:

We closely work with an HQ team and share information with it (MNC 3C-4).

Yeah, we closely work with subsidiary teams for project efficiency and productivity (MNC 2A-1).

R&D knowledge is more centralized and standardized because of time and cost efficiency. This fact becomes a reason why MNC parent companies try to control the local R&D knowledge as a way to reduce repetitive trials and errors in the transfer process. An important point is that core knowledge for a marketing project is locally-specific but core knowledge for an R&D project is not likely to be so. Specific data such as customer tendency and market trends gained through local market research prevent foreign subsidiaries from being dependent on MNC parent companies. In other words, a foreign subsidiary less dependent on information from MNC is apt to locally provide core data unable to be gained from other geographical areas. This situation makes foreign subsidiaries to be more locally-embedded in order to exploit valuable local information sources. This locally-specific information is distinguished from locally-supported information treated in the next section.

		N
Function	R&D	278
	Marketing	280

H 5.1 to H 5.2	$\sigma_1^2 = \sigma_2^2$		*t*	*Df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Info. Dependence on HQ (Q'naire *2A-7)*	.096	Assumed	-7.419	556	.000	R&D	3.71	-.725	-.421
						MKTG	3.14		
Geog. Proximity of Local Networks (Q'naire *3A-3)*	.038	Not assumed	-9.722	555.423	.000	R&D	3.68	-.903	-.599
						MKTG	2.93		

Table 5.1. Univariate Effects of Functions (at $p < 0.05$ level) – Information Dependence and Geographical Proximity

5.3.2 Geographic Proximity to Local Organisations

A difference between R&D and marketing functions in subsidiaries in terms of the geographic proximity of local networks for a project was also reviewed from survey and interview contents. A relevant hypothesis was thus examined through the independent samples t-test in showing bivariate relationships between R&D and marketing. The result reveals that the informational support of local networks for a project appears to be greater in R&D than in marketing. Descriptive statistics in Table 5.1 show that the mean of R&D (3.68) is greater than the mean of marketing (2.93). According to the result of a t-test in the table, the difference between these means ($\mu 1 \neq \mu 2$) is statistically significant at the 5% level ($\alpha = 0.05$). This fact shows that R&D and marketing subsidiaries are significantly different in placing themselves for the geographic proximity to local organisations. As previously-mentioned through group statistics, the average value of R&D is greater than that of marketing. Therefore, we can conclude that R&D subsidiaries tend to shift more toward an external organisation to locally get informational support than marketing subsidiaries do.

How different this finding is from the above result about informational dependence can be considered more in relation to local embeddedness. Qualitative analysis from interview results reveals that a locational purpose of foreign R&D subsidiaries is to easily communicate with the information provider. Interview respondents in R&D subsidiaries said:

> And the support of some companies, which supply specific technical parts, is important. We meet them very often and they are located near this area (MNC 1C-1).

> Yeah, you know that. It is the reason why we are located here. A company close by provides technical support for us but the technology is not core in our R&D process (MNC 3C-4).

In contrast, one of the marketing respondents said:

> We sometimes get specific data or information from external agencies, but it is not very necessary. Most of the market information is created by our market research team. Due to time and cost efficiency, we use the agencies. We focus on our market and customers rather than external agencies (MNC 2D-1).

The informational support of R&D may seem to be similar with informational dependence in the view of knowledge sourcing. However,

information support is not about core knowledge that has a great influence on a project result. It means support for less important knowledge regarding collateral components or information that does not cause a problem even if it is revealed to other companies. This type of knowledge is locally-supported knowledge rather than local-specific knowledge. Local-specific knowledge created in less informational dependence on HQ needs a lot of creative efforts. On the other hand, locally-supported knowledge is apt to be created more easily through contracts with local networks.

When a foreign subsidiary gets informational support from external networks, critical information and a guideline for developing a complete knowledge unit tend to come from the parent company. For this reason, knowledge from informational support is less likely to be local-specific even though the project team sources information locally. The local information supporters originally create component-specific information rather than local-specific data in order to use it in global standards. For example, a project team needs a small chip as a component and the chip provider supports technology for the project team. The technology is not local-specific but locally-supported in this case. Such a case must be distinguished from the creation of local-specific knowledge previously-stated.

Information dependence on HQ is not removed even if information is locally-supported. Centralized social embeddedness toward HQ appears at this time. Therefore, information dependence on

HQ and the informational support level of local networks are significant as factors that cause local embeddedness and home embeddedness. Local specific knowledge and central specific knowledge is more discussed with relevant literature in the discussion section.

5.3.3 Knowledge Sharing Frequency between HQs and Subsidiaries

Another difference between R&D and marketing subsidiaries in knowledge transfer comes from the frequency of sharing knowledge with MNC headquarters. The independent samples t-test was performed to test a relevant hypothesis from survey data, and interview data was analysed to get in-depth views on why it is different in R&D and marketing. The result reveals that the frequency of sharing knowledge with MNC headquarters appears to be higher in R&D than in marketing. Descriptive statistics in Table 5.1 show that the mean of R&D (3.81) is greater than the mean of marketing (3.04). According to the result of a t-test in the table, the difference between these means ($\mu 1 \neq \mu 2$) is statistically significant at the 5% level ($\alpha = 0.05$). This fact means that R&D and marketing are significantly different in the frequency of knowledge sharing activities between foreign subsidiaries and their MNC headquarters. As mentioned previously through group statistics, the average value of R&D is greater than that of marketing. Therefore, we can conclude that R&D subsidiaries have online and offline meetings with HQs more frequently than marketing subsidiaries do in the knowledge transfer process.

At this time, this knowledge sharing frequency must not be interpreted as the level of closeness or the effectiveness of communication. This is because the frequency results from purposeful activities for a specific cross-national project. Instead, it is related to task interdependence between teams in a foreign subsidiary and its HQ. Two Teams work together to remove errors that occur in developing a complete knowledge unit. A complete knowledge unit consists of several knowledge components and thus putting them together needs repetitive trials. Task dependence between MNC subsidiaries and their parent companies becomes higher for this reason. Qualitative results reveal that A-team in a R&D subsidiary and B-team in HQ are very closely connected. When a new project is conducted, these two teams must work together in a type of international working groups. The fact that the manipulation of knowledge components for a complete knowledge unit is more frequent in R&D is also observed. Such a phenomenon can affect knowledge sharing frequency and task interdependence.

Reliability Analysis – Scale (Alpha)
Correlation Matrix

N = 558

	2B-1	2B-2	Alpha if Item Deleted
2B-1	1.000		None
2B-2	.536	1.000	None

- Reliability Coefficients: 2 Items
- Alpha = 0.698, Standardized Item Alpha = 0.698

Table 5.2. Reliability Analysis – Cross-National Knowledge Exchange

Knowledge sharing frequency between a subsidiary and another subsidiary was not previously constructed as a hypothesis. However, this

relation can provide more information about the cross-national knowledge sharing of MNCS and thus it was examined as well. Table 5.2 shows that two different types of knowledge sharing with the parent company and another subsidiary have a minimum correlation for internal consistency in measuring the cross-national knowledge sharing of MNCS. Nevertheless, they cannot be confirmed as items for the same factor because the Cronbach's alpha value[22] is low. Specific alpha values are not known for the case that each item is removed because there are only two items. Knowledge sharing with another subsidiary is more frequent in R&D than in marketing as seen in Table 5.3. The sharing frequency of R&D is higher in both cases of the parent company and another subsidiary. However, the frequency of these different cross-national knowledge sharing can result from different reasons. They will be discussed further in the section of industrial effects and the discussion chapter in terms of work flows and knowledge flows.[23] How two teams communicate and work together being a long distance off needs to be reviewed before that.

			N
Function	R&D		278
	Marketing		280

H 5.3	$\sigma_1^2 = \sigma_2^2$		*t*	*Df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper

[22] The alpha value is acceptable in a survey-based study when it is greater than or equal to 0.7 (George and Mallery, 2003).

[23] Work flows and knowledge flows are defined as knowledge sharing accompanied by co-work and knowledge sharing in the simple relation of information providers and users.

Knowledge Sharing Freq. with HQ (Q'naire *2B-1)*	.080	Assumed	-10.274	556	.000	R&D	3.81	-.926	-.629
						MKTG	3.04		
Knowledge Sharing Freq. with Subs. (Q'naire *2B-2)*	.009	Not assumed	-8.585	553.730	.000	R&D	3.69	-.853	-.535
						MKTG	3.00		

Table 5.3. Univariate Effects of Functions (at $p < 0.05$ level) – Cross-National Knowledge Exchange

5.3.4 Transfer Methods

Expatriates, international working groups, and international assignments were not separately considered in many cases in the past years (Minbaeva and Michailova, 2004). However, international working groups and international assignments are used more independently from the influence of expatriates due to the advancements in communication technologies. A difference between R&D and marketing functions in subsidiaries in terms of the methods they use to transfer knowledge with MNC headquarters needs to be explored closely. Expatriates, international working groups, and international assignments are regarded as more important or less important, depending on the opinion of MNC employees involved in a global project. Descriptive statistics in Table 5.5 show that the mean of marketing (3.72) is greater than the mean of R&D (3.14) in expatriates. However, in international working groups and international assignments, the means of R&D (3.53, 3.74) are greater than the means of marketing (3.28, 3.48). According to the result of a t-test in the table, the differences between these means ($\mu 1 \neq \mu 2$) are statistically significant at the 5% level ($\alpha = 0.05$). This fact means that R&D and marketing are significantly different in each method of knowledge transfer between

foreign subsidiaries and their MNC headquarters. As previously-mentioned through group statistics, the average value of R&D is greater in international working groups and international assignments, whereas the average value of marketing is greater in expatriate. Therefore, we can conclude that R&D prefers international working groups or international assignments to expatriates as a knowledge transfer method. However, marketing mainly uses expatriates rather than international working groups and international assignments in knowledge transfer.

Video conferences, lowered language barriers, and affordable flights provide MNC cross-border teams with conditions for direct communications and easier cooperation. Nevertheless, marketing relatively prefers indirect communications through expatriates compared to R&D. A lower sharing frequency and task interdependence with MNC HQ become one of the reasons. These two are related to the above-mentioned characteristic of local-specific knowledge. According to interview results, marketing projects include local-specific knowledge more and thus the amount of cross-nationally overlapped knowledge is smaller in marketing. It becomes a reason why marketing employees think that it is not very effective to work in international working groups and international assignments. Instead, marketing expatriates have a role to balance international information and to move useful knowledge. In contrast, task interdependence between a foreign subsidiary and HQ is higher in R&D and they have to keep in close touch with each other. More immediate international working groups and assignments become better

for global R&D projects. This phenomenon should not be over-generalized because it is relative in comparing R&D and marketing as well as it is limited in the global-only projects.

Reliability Analysis – Scale (Alpha)
Correlation Matrix

N = 557[24]

	3C-4-1	3C-4-2	3C-4-3	Alpha if Item Deleted
3C-4-1	1.000			.587
3C-4-2	.244	1.000		.534
3C-4-3	.367	.416	1.000	.390

- Reliability Coefficients: 3 Items
- Alpha = 0.604, Standardized Item Alpha = 0.610

Table 5.4. Reliability Analysis – Knowledge Exchange Methods

The test result of reliability analysis shows that three items for knowledge transfer methods have internal consistency. The Cronbach's Alpha value of around 0.6 is low for internal consistency and the correlations of items are low as well. This result means that those three items are likely to indicate different factors. Expatriates (3C-4-1), international working groups (3C-4-2), and international assignments (3C-4-3) can thus be recognized as different means in knowledge transfer.

		N
Function	R&D	278
	Marketing	279

H 5.4	$\sigma_1^2 = \sigma_2^2$		*T*	*Df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Knowledge Transfer Method 1 (Q'naire *3C-4-1)*	.171	Assumed	7.390	555	.000	R&D	3.14	.423	.730
						MKTG	3.72		
Knowledge Transfer Method 2 (Q'naire *3C-4-2)*	.020	Not assumed	-3.474	547.898	.001	R&D	3.53	-.390	-.108
						MKTG	3.28		

[24] Answers to those three questions are missing in a survey data set. Thus, the total number analysed is 557 in Table 5.4 and 5.5.

Knowledge Transfer Method 3 (Q'naire *3C-4-3)*	.077	Assumed	-3.590	555	.000	R&D	3.74	-.392	-.115
						MKTG	3.48		

Table 5.5. Univariate Effects of Functions (at $p < 0.05$ level) – Knowledge Exchange Methods[25]

5.3.5 Level of Decision Autonomy over Local Strategies

Preliminary interviews showed that MNC subsidiaries mainly would have two types of the delegation of decision–making. One of them was decision autonomy that subsidiaries have from their parent company over local strategies. A difference in marketing and R&D subsidiaries in terms of the levels of decision autonomy that they have from their parent company over local strategies was analysed. This issue is about how much a subsidiary can make its own decision about local strategies rather than being influenced by the parent company. Descriptive statistics in Table 5.6 show that the mean of marketing (3.79) is greater than the mean of R&D (2.88) in local strategies. According to the result of a t-test in the table, the differences between these means ($\mu 1 \neq \mu 2$) are statistically significant at the 5% level ($\alpha = 0.05$). This fact means that R&D and marketing subsidiaries are significantly different in levels of control by their MNC headquarters in decision–making over local strategies. As mentioned previously through group statistics, the average value of marketing is greater in local strategies. Therefore, we can conclude that

[25] The degree of freedom indicates 555 when equal variances are assumed. This value is 556 for most items but one of the survey respondents did not answer to those three questions.

marketing subsidiaries are controlled less by the parent company when making their own decisions about local strategies.

The meaning of this autonomy can be reviewed with additional qualitative analysis. Marketing subsidiaries make their own decision about building job descriptions and local marketing plans. Marketing requires knowledge sets of local markets, and how these are addressed is left to the subsidiary. Marketing subsidiaries thus construct and perform decentralized local strategies on the basis of a rough direction by HQ. MNC HQ just indicates a guideline for a new project and then local marketers decide what they have to do. Instead, HQ controls the budget of marketing subsidiaries more and even manages recruiting plans. The qualitative data reveals that HQs control the working conditions of host employees by despatching an expatriate who manages local resources such as a chief financial officer (CFO) and a chief HR officer (CHO). Such an expatriate controls efficiency in a foreign subsidiary by managing supporting resources such as staffing, compensation, benefits, and working environment. This method is a kind of give-and-take schemes of parent companies to combine autonomy with control. MNC HQs tend to prevent host employees from being demotivated through addressing some parts of decision-making controlled and other parts delegated.

									N
						Function	R&D		278
							Marketing		280
H 5.5 to H 5.6	$\sigma_1^2 = \sigma_2^2$		*T*	*Df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper

Decision Autonomy over Local Strategies (Q'naire *3A-4)*	.321	Assumed	11.277	556	.000	R&D	2.88	.747	1.062
						MKTG	3.79		
Decision Autonomy over Local Resources (Q'naire *3A-5)*	.003	Not assumed	-6.260	555.476	.000	R&D	3.48	-.610	-.319
						MKTG	3.02		

Table 5.6. Univariate Effects of Functions (at $p < 0.05$ level) – Subsidiary Autonomy

5.3.6 Level of Decision Autonomy over HR/Financial Resources

Another type of the delegation of decision-making identified through preliminary interviews was decision autonomy that subsidiaries have from their parent company over HR/Financial resources. A difference in marketing and R&D subsidiaries in terms of the levels of decision autonomy that they have from their parent company over HR/Financial resources was thus analysed. This issue is about how much a subsidiary can make its own decision about HR/financial resources rather than being influenced by the parent company. Descriptive statistics about local HR/financial resources in Table 5.6 show that the mean of R&D (3.48) is greater than the mean of marketing (3.02). According to the result of a t-test in the table, the differences between these means ($\mu 1 \neq \mu 2$) are statistically significant at the 5% level ($\alpha = 0.05$). This fact means that R&D and marketing subsidiaries are significantly different in levels controlled by their MNC headquarters in decision-making over HR/financial resources. As mentioned previously through group statistics, the average value of R&D is greater in local HR/financial resources. Therefore, we can conclude that R&D subsidiaries make their own

decisions about local HR/financial resources in a less controlled environment by the parent company.

This type of autonomy regarding local HR/financial resources must be distinguished from another type regarding local strategies. Some more findings about how R&D subsidiaries deal with this autonomy can be added from qualitative analysis. When interviewees were asked about subsidiary autonomy and control, marketing employees said:

> We build local marketing plans and job descriptions. The headquarters does not care about them very much (MNC 2D-3).

> My organisation builds annual strategies and plans on the basis of a very rough guideline, which comes from the headquarters. Yeah, we own great autonomy in creating the local plans. I feel the interference of the headquarters in the matters is not very severe (MNC 3D-1).

> Autonomy over building marketing plans? We are independent to build them but I think autonomy in others is more important. Our recruiting and staffing have to follow the guidelines from the headquarters. And I do not feel it is free to spend money. The headquarters tightly controls our budget and costs (MNC 3D-2).

This fact was confirmed in an HQ employee at the managerial level (MNC 3B-1).

A financial manager dispatched by the headquarters is working here (MNC 1D-2).

An HR manager, who comes from the headquarters, manages our HR policies and practices (MNC 2D-1).

On the other hand, R&D employees mentioned different autonomy and control types, illustrated by the following comments:

I believe we are relatively free in spending money. We can also work at home if we want to and manage working time by ourselves. For example, I can work from 9:00 am to 5:00 pm. He (indicating another interviewee) can work from 11:00 am to 7:00 pm or 8:00 am to 4:00 pm (MNC 1C-2).

But I really want my organisation to have more power to build our R&D plans and schedules. We always follow the plans created by the headquarters (MNC 1C-3).

The Korean headquarters provides detailed job descriptions for our projects (MNC 3C-3).

A good thing is financial support. The parent company does not interfere very much in spending money or recruiting new employees (MNC 3C-2).

This fact was confirmed by an HQ employee at the managerial level (MNC 3A-1).

Um (pause), I am not satisfied with the fact. We cannot be involved in decision-making. I mean our opinion is not taken enough into consideration in order to improve specific plans or processes (MNC 2C-1).

I really want to have more opportunities to participate in major decisions on project plans. Currently, the headquarters interferes in many matters in R&D processes (MNC 1C-1).

Based on the interviews, many R&D subsidiaries have recruited employees and used money more independently. R&D subsidiaries do not have difficulties in requesting more budgets to their parent companies. R&D employees are also relatively free when deciding where they work and when they work. However, HQ provides R&D subsidiaries with detailed job descriptions and local R&D plans. R&D subsidiaries must follow them and they are prerequisites for their more untrammelled

working conditions. These facts mean that R&D involves doing things that have to fit into the rest of the company, though the subsidiaries are relatively free to organise themselves as long as they produce within the overall template. This is also a kind of give-and-take schemes of parent companies to combine autonomy with control. How these two autonomy types are linked to other findings delivered above should be reviewed in the discussion section. Before that, considering some factors that can mediate those findings is required to increase the validity of above arguments.

5.3.7 Extension of Findings into Multivariate Relationships

How the variation of R&D and marketing functions has an influence on eight variables[26] has been investigated. The findings indicate the main effects of R&D and marketing on these variables in my research. However, there may be influences by other factors on the main effects and they need to be reviewed to clarify the main effects. Additional multivariate analysis was performed for this reason and it had some objectives. The first objective was to look at the effect by the variation of ICT and automobile industries. In addition, whether interaction effects between industrial sectors and functions exist had to be checked. This type of effects can happen when one independent variable interferes in another differently from main effects. The descriptive statistics of survey data reveal that there are differences in project team size as well. The

[26] The variables may seem to be six but three different transfer methods have been tested separately.

effect by project team size had to be thus investigated in comparing when it is controlled and when it is not controlled. Finally, the type I error had to be checked through additional multivariate analysis. When eight dependent variables are tested separately, a type I error may occur by isolated dependent variables. To look at whether the difference of R&D and marketing about a dependent variable is real, a multivariate analysis had to be performed.

Multi-way multivariate analysis of variance (multi-way MANOVA) and multi-way multivariate analysis of covariance (multi-way MANCOVA) were employed to do so. They aimed to compare test results when project team size was controlled as a covariate or not. At this time, sectors (ICT or automobile industries) and functions (R&D or marketing) were categorical independent variables. Dependent variables were information dependence, informational support, knowledge sharing frequency, transfer methods (1, 2, 3), decision autonomy over local strategies, and decision autonomy over HR/financial resources. Project team size was used as a covariate and its effect was controlled in the multi-way MANCOVA model. Multiple regression analysis and logistic regression analysis were initially considered. However, a MANCOVA model was better than a regression model in order to use project team size as a control variable. Logit and probit models cannot be used because dependent variables must be present in a nominal scale. Although my study has categorical variables such as sectors and functions, using them as dependent variables can obstruct the focus on what R&D and

marketing differently affect.[27] The following tables indicate the descriptive statistics of eight dependent variables about two categorical independent variables. The results of multivariate tests by multi-way MANOVA are described in Table 5.7 and the results of multi-way MANCOVA are shown in Table 5.9.

		N
Function	R&D	278
	Marketing	280
Industry	ICT	368
	Automobile	190

DV	IV			*df*	Mean Square	*F*	Sig.	Effect Size
	Variables	Alternatives	Mean					
Info. Dependence on HQ (2A-7)	Function	R&D	3.71	1	45.658	54.964	.000	.090
		Marketing	3.14					
	Industry	ICT	3.44	1	1.849	2.226	.136	.004
		Automobile	3.39					
	F. X I.	ICT-R&D	3.73	1	.643	.774	.379	.001
		Auto-R&D	3.68					
		ICT-Marketing	3.20					
		Auto-Marketing	3.00					
Knowledge Sharing Freq. with HQ (2B-1)	Function	R&D	3.81	1	86.864	110.635	.000	.166
		Marketing	3.04					
	Industry	ICT	3.47	1	7.892	10.051	.002	.018
		Automobile	3.33					
	F. X I.	ICT-R&D	3.87	1	1.531	1.950	.163	.004
		Auto-R&D	3.73					
		ICT-Marketing	3.14					
		Auto-Marketing	2.78					
Knowledge Sharing Freq. with Subs. (2B-2)	Function	R&D	3.69	1	65.038	71.265	.000	.114
		Marketing	3.00					
	Industry	ICT	3.34	1	.817	.895	.345	.002
		Automobile	3.35					
	F. X I.	ICT-R&D	3.70	1	.710	.778	.378	.001
		Auto-R&D	3.69					
		ICT-Marketing	3.05					
		Auto-Marketing	2.89					
Decision Autonomy over Local Strategies (3A-4)	Function	R&D	2.88	1	113.755	128.132	.000	.188
		Marketing	3.79					
	Industry	ICT	3.41	1	1.063	1.197	.274	.002
		Automobile	3.19					
	F. X I.	ICT-R&D	3.01	1	5.575	6.280	.012	.011
		Auto-R&D	2.70					
		ICT-Marketing	3.76					
		Auto-Marketing	3.88					
Decision Autonomy over Local Resources (3A-5)	Function	R&D	3.48	1	26.551	34.517	.000	.059
		Marketing	3.02					
	Industry	ICT	3.24	1	.153	.198	.656	.000
		Automobile	3.26					
	F. X I.	ICT-R&D	3.50	1	.013	.017	.897	.000
		Auto-R&D	3.45					
		ICT-Marketing	3.03					
		Auto-Marketing	3.00					

[27] More information about the choice of multivariate analysis is described in the methodology chapter.

R Squared Values of Type III Sum of Squares in the Corrected Model		
.095 (Adjusted .090)	.176 (Adjusted .172)	.120 (Adjusted .115)
.198 (Adjusted .193)	.066 (Adjusted .061)	
Described in the order of dependent variables mentioned above.		

Table 5.7. Multivariate Effects (at $p < 0.05$ level) – Cross-National[28]

5.3.7.1 Industrial Effects and Cost Efficiency

When the difference between industrial sectors is observed without controlling the effect of project team size, the effect of knowledge sharing frequency is solely significant. Knowledge sharing frequency between subsidiaries and HQ is higher in the ICT industry than in the automobile industry. To get an answer about why quantitative analysis shows such a result, interviews have been analysed. They reveal consistent evidence that supports a higher sharing frequency in the ICT industry.

Previously, the fact that R&D employees experience the manipulation of knowledge components for a complete knowledge unit was found and stated. A big issue related to this fact is *cost efficiency* that must be considered critically across nations in MNCs. Costs paid for the newly developing components are much higher in the automobile industry than in the ICT industry. For this reason, automobile MNCs plan a new project very carefully at the beginning in order to reduce errors in the development process. The knowledge sharing level in the middle of a project decreases in automobile MNCs as a result. Cost efficiency is an

[28] Four commonly used measures of effect size in AVOVA are eta squared, partial eta squared, omega squared, and the intraclass correlation (Tabachnick and Fidell, 1989). MANOVA and MANCOVA tables in this thesis display partial eta squared values for effect size.

important factor for MNCs in global competitions and affects knowledge sharing between subsidiaries and HQ.

R&D		Marketing	
ICT	Auto	ICT	Auto
Most Frequent	Frequent	Less frequent	Infrequent

Table 5.8. Knowledge Flows between Subsidiaries and the Parent Company

In addition, the same assignment is often given to two ICT R&D subsidiaries. They compete with each other for a better outcome and have *three-way meetings* with HQ. They share basic information for a specific project and make an effort for impressive intermediate outcomes to lead the R&D game. The intermediate outcomes are discussed and evaluated by the involved subsidiaries and HQ for the next steps. In this process, knowledge sharing conference calls with HQ and the paired subsidiary become more frequent.

Decision autonomy over local strategies is also statistically significant as the effect of functions interacted by sectors. Table 5.7 reveals automotive marketing, ICT marketing, ICT R&D, and automotive R&D in descending order of decision autonomy degrees over local strategies. The previous section has found out the fact that decision autonomy over local strategies is affected by knowledge sharing frequency with the parent company and information dependence on it. When this autonomy is explored across sectors as well as functions, two other critical factors that influence it more are identified: the project

period and the local-specific quality of knowledge. Basically, decision autonomy over local strategies becomes greater when knowledge sharing with the parent company is less frequent because information dependence on HQ tends to be lower. However, the *local-specific quality* of knowledge outcomes makes the knowledge process decentralized from the parent company. Decision autonomy over local strategies for the knowledge process is granted to the subsidiary at this point.

In addition, the *project performance period* from start to finish is important for the autonomy. The project time required for ICT R&D projects is normally shorter than that for automobile R&D projects. This is because the *average life expectancy* of ICT technologies is shorter than that of automobile technologies. Advancement in a specific ICT technology is speedier than in a specific automobile technology due to more market needs for the new version of a specific product. In this situation, MNCs control local knowledge processes and strategies more. The project period and the local-specific quality of knowledge are thus more important than knowledge sharing frequency and information dependence for indicating the degree of decision autonomy over local strategies. This fact means that this autonomy can be high on the basis of a longer project period and a more local-specific quality of knowledge even if information dependence on HQ is high.

ICT marketing subsidiaries are structurally more dependent on the regional HQ than automobile marketing subsidiaries are. The *market overlap* of ICT products sold and used across adjacent countries brings

about the dependence on the regional HQ for the sharing of more standardized marketing information. That is the reason why decision autonomy over local strategies is greater in automobile marketing than in ICT marketing. In the case of automobile marketing, each market is more independent and thus the control power of regional HQs becomes lower compared to ICT marketing.

		N
Function	R&D	278
	Marketing	280
Industry	ICT	368
	Automobile	190

DV	IV			*df*	Mean Square	*F*	Sig.	Effect Size
	Variables	Alternatives	Mean					
Info. Dependence on HQ (2A-7)	Covariates	Team Size		1	.187	.230	.632	.000
					.185	.222	.637	.000
		Home		1	9.646	11.823	.001	.021
	Function	R&D	3.71	1	43.180	52.923	.000	.087
		Marketing	3.14		40.524	48.715	.000	.081
	Industry	ICT	3.44	1	.423	.519	.472	.001
		Automobile	3.39		2.011	2.418	.121	.004
	F. X I.	ICT-R&D	3.73	1	.963	1.180	.278	.002
		Auto-R&D	3.68		.505	.607	.436	.001
		ICT-Marketing	3.20					
		Auto-Marketing	3.00					
Knowledge Sharing Freq. with HQ (2B-1)	Covariates	Team Size		1	.007	.009	.923	.000
					.007	.009	.925	.000
		Home		1	4.029	5.160	.023	.009
	Function	R&D	3.81	1	81.790	104.769	.000	.160
		Marketing	3.04		79.627	101.236	.000	.155
	Industry	ICT	3.47	1	4.940	6.327	.012	.011
		Automobile	3.33		7.674	9.756	.002	.017
	F. X I.	ICT-R&D	3.87	1	1.887	2.417	.121	.004
		Auto-R&D	3.73		1.444	1.836	.176	.003
		ICT-Marketing	3.14					
		Auto-Marketing	2.78					
Knowledge Sharing Freq. with Subs. (2B-2)	Covariates	Team Size		1	.539	.589	.443	.001
					.539	.590	.443	.001
		Home		1	.012	.014	.907	.000
	Function	R&D	3.69	1	56.620	61.885	.000	.101
		Marketing	3.00		56.789	62.181	.000	.101
	Industry	ICT	3.34	1	.953	1.041	.308	.002
		Automobile	3.35		1.063	1.164	.281	.002
	F. X I.	ICT-R&D	3.70	1	.493	.539	.463	.001
		Auto-R&D	3.69		.483	.529	.467	.001
		ICT-Marketing	3.05					
		Auto-Marketing	2.89					
Decision Autonomy over Local Strategies (3A-4)	Covariates	Team Size		1	.265	.302	.583	.001
					.263	.296	.587	.001
		Home		1	7.098	8.087	.005	.014
	Function	R&D	2.88	1	103.341	117.743	.000	.176
		Marketing	3.79		107.787	121.255	.000	.180
	Industry	ICT	3.41	1	.208	.237	.626	.000
		Automobile	3.19		1.236	1.391	.239	.003
	F. X I.	ICT-R&D	3.01	1	4.713	5.370	.021	.010
		Auto-R&D	2.70		5.832	6.561	.011	.012

		ICT-Marketing	3.76					
		Auto-Marketing	3.88					
Decision Autonomy over Local Resources (3A-5)	Covariates	Team Size		1	.034 .035	.045 .045	.833 .832	.000 .000
		Home		1	4.142	5.418	.020	.010
	Function	R&D	3.48	1	26.327	34.439	.000	.059
		Marketing	3.02		24.986	32.426	.000	.055
	Industry	ICT	3.24	1	.020	.026	.872	.000
		Automobile	3.26		.120	.155	.694	.000
	F. X I.	ICT-R&D	3.50	1	.010 .006	.014 .008	.907 .930	.000 .000
		Auto-R&D	3.45					
		ICT-Marketing	3.03					
		Auto-Marketing	3.00					

R Squared Values of Type III Sum of Squares in the Corrected Model		
.114 (Adjusted .106)	.184 (Adjusted .177)	.121 (Adjusted .113)
.095 (Adjusted .089)	.177 (Adjusted .171)	.120 (Adjusted .114)
.210 (Adjusted .202)	.075 (Adjusted .067)	
.198 (Adjusted .192)	.066 (Adjusted .060)	
Described in the order of dependent variables mentioned above.		

Table 5.9. Cross-National (at $p < 0.05$ level) – Control of Team Size and Home Countries[29]

As explained in the previous chapter, lower values in the cells of Table 5.9 indicate multivariate effects when team size alone is controlled. Upper values reveal multivariate effects when both team size and home are controlled. As seen in the table, the difference of home countries does not affect the effects of functions, sectors, and functions interacted by sectors on dependent variables. It means that the statistical significance of the effects is not changed at all. For this reason, multivariate effects in the table are significant regardless of home countries. The effects of R&D and marketing on cross-national features are significant beyond home country effects. This research mainly looks at functional effects on dependent variables, controlling home countries and team size. Thus, the

[29] Type I Error: Differences between R&D and marketing observed in t-tests regarding dependent variables are still significant even when the type I error is reduced through multivariate analysis. As a result, above findings from the hypothesis tests are strongly supported in cross-checking by two multivariate analyses.

direct effects of home countries on cross-national features are not tested in this MANCOVA. Home country effects on dependent variables are briefly introduced in the discussion section in order to check how the home country effect of Lam (2003) is seen with above dependent variables.

5.3.7.2 Size of Project Teams

The previous chapter states that there is the effect of team size on some local relational factors in R&D and marketing subsidiaries. This chapter also examines the effect of team size on cross-national factors. Table 5.9 describes the results of MNACOVA controlling team size as a covariate. When the effect of project team size is controlled, the effects of functions, sectors, and functions interacted by sectors are not changed from the results of Table 5.7 at the 95% confidence level. The functional effect on above five variables, the industrial effect on the knowledge sharing frequency with HQ, and the interactive effect on decision autonomy over local strategies are still significant. The other effects on relevant variables are not still significant either. The result means that the effect of team size is not found in relation to cross-national relationships in MNC knowledge processes.

There is a question about why this result is caused in the cross-national environment only. The size of project teams is generally bigger in the automobile industry than in the ICT industry. The main reason why the effect of team size on cross-national knowledge sharing processes is

not found is figured out through the additional qualitative analysis. The reason is linked to the size of members involved in knowledge sharing through online and offline meetings. All team members are not involved in cross-national interactions, but the few case-relevant members participate regardless of distinguishing ICT from automobile.

Therefore, the main findings that compose this chapter are seen in Table 5.10.

	R&D		Marketing	
	ICT	Auto	ICT	Auto
Information Dependency on HQ	High		Low	
Sharing Frequency with HQ	Highest	High	Low	Lowest
Sharing Frequency with SUBS	High		Low	
Project Period[30]	Long	Longest	Shortest	Short
Local-Specific Knowledge[31]	Less	Less	More	Most
Autonomy on Planning Strategies	Low	Lowest	High	Highest
Autonomy on Planning Resources	High		Medium	
Knowledge Transfer Method	Co-work Teams		Expatriates	

Table 5.10. Summary of Findings – Knowledge Transfer Factors

5.4 Discussion

This chapter addresses two types of local autonomy on the basis of local embeddedness, task interdependence, and knowledge transfer methods observed in R&D and marketing. A question can arise at this point; how are different decision autonomy types over local strategies

[30] 3C-2, 3C-3-1 and 3C-3-2 in the survey questionnaire measure the number and period of projects.

[31] Local-specific knowledge is defined as knowledge shaped in a specific country context. Customization of ICT and automotive product options based on the preference of local customers is not about R&D. In this case, the application of local contexts occurs in marketing and manufacturing knowledge.

and HR/financial resource linked to knowledge transfer? To solve this, we need to think about the effects of these two autonomy types.

Decision autonomy over local strategies heightens the loyalty of local employees to their subsidiaries by encouraging participation in decision-making. This environment provides working conditions good enough to share their own experience and ideas. However, it is not very easy to transfer valuable information from them to MNC HQ. When decision autonomy over local strategies becomes greater, core information may stay in the subsidiary without sharing it with HQ. This is because of a monopolistic situation caused by the imbalance of power between a knowledge sender and its recipient (Mudambi and Navarra, 2004). Moreover, marketing subsidiaries have more local-specific knowledge than R&D subsidiaries have, so they become less dependent on HQ information. Task interdependence between marketing subsidiaries and HQ becomes lower as well. Managing the loss of local specific knowledge that results from allocation of decision autonomy is important at this point (Anand and Mendelson, 1997). Dispatching hands-on workers and letting them work with local employees in a weighty project become one of the solutions. Many MNCs also make efforts to get local ideas through periodical video conferences and social events. Geographical sub-HQs hold regular activities with local subsidiaries and share information and plans about their geographical markets.

Decision autonomy over local HR/financial resources is accompanied by some benefits related to working environment. Local

employees in this case can more autonomously decide who to work with, what to utilize, where to work, and when to work. Decision autonomy over local HR/financial resources is likely to result in better compensation for local employees because subsidiaries can manage their budget more freely. There is a reason why those benefits are necessary for foreign R&D subsidiaries. It is not easy for HQ to localize R&D strategies because confidential information may be leaked to rival firms. This issue is treated as the loss of central specific knowledge in Anand and Mendelson (1997). Core and valuable information is likely to be managed directly by HQ for this reason. Then this issue causes the demotivation of R&D subsidiaries. More frequent communications and benefits to be able to organise themselves become more important for R&D knowledge transfer. Tele-communication technologies help R&D subsidiaries and HQ to understand what they have to do for each other in a cooperative project through frequent meetings even though core knowledge is centralized. The relationships in local embeddedness, knowledge sharing, and subsidiary autonomy are drawn in Table 5.11. Autonomous behaviour causes locally-embedded structures (Garcia-Pont et al., 2009). However, some critical factors in the table result in the loss or gain of local embeddedness and home embeddedness[32].

This table implies three things regarding autonomy over planning local strategies and local embeddedness. First, four factors of knowledge quality, knowledge sharing with HQ, the project period,

[32] Home embeddedness indicates more dependence on the home country (parent company) as the opposite of local embeddedness.

project costs, and relationships with local networks significantly affect both autonomy over planning local strategies and local embeddedness. Second, the first fact does not mean that autonomy over planning local strategies and local embeddedness always have a positive relationship. This is because the rates of increase and decrease indicated by arrow are different. Third, previous studies that deal with local embeddedness focused on the local knowledge networks of foreign subsidiaries. However, other knowledge factors can affect the local embeddedness of MNC subsidiaries.

		MNC Subsidiaries	
		Autonomy over Planning Local Strategies	Local Embeddedness
Knowledge Quality	Local-Specific	↑	↑
	Product-Specific	↓	-
Knowledge Sharing with HQ	More	↓	↓
	Less	↑	↑
Project Period[33]	Longer	↑	(↑)
	Shorter	↓	-
Relationships with Local Networks	Sticky	↑	↑
	Loose	↓	↓
Project Costs	Higher	↓	↓
	Lower	↑	↑

Table 5.11. Local Embeddedness and Subsidiary Autonomy in Knowledge Transfer[34]

Finally, home country effects on cross-national features are discussed further. As described in Table 5.12, Western companies are

[33] The project performance period itself does not affect local embeddedness but a longer period indirectly increases local embeddedness by accepting enough time for the closeness in relationships with local networks.
[34] Arrows in this table indicate increase and decrease. The rates of them are not the same.

greater than Eastern companies in home country effects on information dependence on HQ, knowledge sharing frequency with HQ, decision autonomy over local strategies, and decision autonomy over local resources. This fact means that the foreign subsidiaries of Western MNCs are likely to have a closer relationship with the parent company and higher autonomy, compared with Eastern companies. According to a previous research finding, higher information dependence on HQ is linked to lower autonomy over local strategy. However, this effect can be affected by a particular system of Western MNCs. Empirical data is not enough to explore this matter because this research has been designed for the comparison of R&D and marketing, controlling home country effects. However, a more effective team communication system of Western companies is expected to increase the closeness to the parent company.

		N
Home	Western	209
	Eastern	349
Function	R&D	278
	Marketing	280

DV	IV			*df*	Mean Square	*F*	Sig.	Effect Size
	Variables	Alternatives	Mean					
Info. Dependence on HQ (2A-7)	Covariate	Team Size		1	.126	.155	.694	.000
	Home	Western	3.57	1	10.079	12.451	.000	.022
		Eastern	3.34					
	Function	R&D	3.71	1	36.032	44.510	.000	.074
		Marketing	3.14					
	H. X F.	Western-R&D	3.78	1	4.073	5.032	.025	.009
		Eastern-R&D	3.68					
		Western-Mktg.	3.41					
		Eastern-Mktg.	2.95					
Knowledge Sharing Freq. with HQ (2B-1)	Covariate	Team Size		1	.032	.040	.842	.000
	Home	Western	3.52	1	5.912	7.489	.006	.013
		Eastern	3.36					
	Function	R&D	3.81	1	73.644	93.295	.000	.144
		Marketing	3.04					
	H. X F.	Western-R&D	3.89	1	1.149	1.456	.228	.003
		Eastern-R&D	3.77					
		Western-Mktg.	3.22					
		Eastern-Mktg.	2.91					

Knowledge Sharing Freq. with Subs. (2B-2)	Covariate	Team Size		1	.535	.585	.445	.001
	Home	Western	3.33	1	.096	.105	.747	.000
		Eastern	3.36					
	Function	R&D	3.69	1	58.766	64.195	.000	.104
		Marketing	3.00					
	H. X F.	Western-R&D	3.73	1	.230	.251	.617	.000
		Eastern-R&D	3.67					
		Western-Mktg.	2.99					
		Eastern-Mktg.	3.01					
Decision Autonomy over Local Strategies (3A-4)	Covariate	Team Size		1	.056	.064	.800	.000
	Home	Western	3.55	1	10.244	11.767	.001	.021
		Eastern	3.21					
	Function	R&D	2.88	1	84.228	96.747	.000	.149
		Marketing	3.79					
	H. X F.	Western-R&D	3.23	1	7.989	9.177	.003	.016
		Eastern-R&D	2.71					
		Western-Mktg.	3.81					
		Eastern-Mktg.	3.78					
Decision Autonomy over Local Resources (3A-5)	Covariate	Team Size		1	.032	.042	.839	.000
	Home	Western	3.34	1	4.137	5.424	.020	.010
		Eastern	3.19					
	Function	R&D	3.48	1	27.301	35.795	.000	.061
		Marketing	3.02					
	H. X F.	Western-R&D	3.57	1	.223	.293	.589	.001
		Eastern-R&D	3.43					
		Western-Mktg.	3.15					
		Eastern-Mktg.	2.93					

R Squared Values of Type III Sum of Squares in the Corrected Model		
.119 (Adjusted .113)	.174 (Adjusted .168)	.118 (Adjusted .112)
.215 (Adjusted .209)	.076 (Adjusted .069)	

Described in the order of dependent variables mentioned above.

Table 5.12. Effects of Home Countries (at $p < 0.05$ level) – Cross-National

CHAPTER 6: EMPIRICAL STUDY 3

HRM Configurations by R&D and Marketing in Supporting MNC Knowledge Transfer

6.1 Introduction

This chapter aims at structuring the distinctive sets of HRM practices helpful for knowledge transfer to explore how R&D and marketing differently perceive them. They are investigated in terms of individual-based versus group-based HRM, performance-free versus performance-based HRM, and employee skill training versus leadership training. Previous two chapters identify the types of local autonomy on the basis of local embeddedness, task interdependence, and knowledge transfer methods observed between MNC subsidiaries and the headquarters. Task interdependence and knowledge complexity in the knowledge creation process of MNC subsidiaries on the basis of team relationships, team activities, and knowledge explicitness are treated as well. More importantly, marketing and R&D functions reveal noticeable differences in those factors. These differences are connected with this chapter, and different HRM settings in marketing and R&D are affected by them, task interdependence in particular. A linkage between HRM and

task interdependence has been mentioned in previous studies such as Gittel (2000), Liden et al. (1997), Snell et al. (2000), and Stevens and Campion (1994). However, these studies do not deal with HRM in the knowledge transfer of MNCs. Also, HRM issues shaped by functional differences are not reflected.

Previous HRM-knowledge transfer studies primarily focused on how HRM practices influence organisational performance related to knowledge transfer. For example, one of the HRM-knowledge transfer studies shows that performance appraisal and training arouse the ability of employees. Performance-based compensation and internal communication induce the motivation of employees for knowledge creation (Minbaeva et al., 2003). However, my research focuses on the formation of distinctive HRM systems for knowledge outcomes rather than the effects of HRM practices on knowledge outcomes. What is considered for HRM settings and how HRM systems are distinctively formed according to it are important at this point. Marketers and R&D researchers are different in many ways such as preferred working styles, process, and environment. Therefore, HRM that manages marketers and R&D researchers needs to provide different support for them. To look into these matters, HRM practices divided into six categories are reviewed in both marketing and R&D subsidiaries. High performance work practices are specifically observed with more attention because my research views knowledge as the project outcome of MNCs. The following

theoretical framework is carefully constructed in four sections that show how this research is performed.

6.2 Theoretical Framework and Hypotheses

6.2.1 MNC Knowledge Transfer and HRM

Many studies have dealt with relations between HRM practices and organisational performance such as financial outcomes, job satisfaction, and organisational commitment. Purcell and Hutchinson (2007) present an HRM-performance model that indicates a causal flow from HRM practices to outcomes in firms. It shows that perceived HRM practices result in financial or economic outcomes through impacts on the attitudes and behaviour of employees. At this point, employee attitudes and behaviour are viewed as employee reactions, which bring about employee responses accompanied with subsequent behaviour. Unit level outcomes produced by such employee behaviour do not show knowledge resource directly. However, knowledge as a project outcome is closely linked to financial performance. Employees in knowledge-intensive companies must plunge into innovative knowledge resources to produce organisational performance. They inevitably develop knowledge resources such as R&D technologies and marketing tools to achieve an organisational goal in a specific project. Knowledge resources thus become the important outputs of human resources connected with organisational outcomes. There are linkages between knowledge management, HRM, and business strategies across industries. Employees

individually form original ideas that can possibly create economic value in the near future. HRM practices will encourage them to initiate creative actions to produce new knowledge from their ideas. Then the knowledge can be developed eventually as a form of intellectual property in the wide range of business (Hislop, 2005).

The HRM-performance causal chain goes through intended practices, actual practices, perception of practices, employee attitude, employee behaviour, and unit level outcomes. The HPCC requires the consideration of what role HRM plays for the causal results related to employee behaviour and outcomes. Motivating employees to build organisational capabilities for sustained value creation is the main role of HRM (Rucci, 2009). In the HPCC of knowledge-intensive firms, HRM encourages employees to maximize learning capabilities through behavioural changes which will lead to valuable knowledge creation. More specifically, HRM motivates employees to make knowledge explicit and training as one of HRM practices develops skills in organisations (Hansen et al., 1999). This fact shows that HRM practices help employees share their own tacit knowledge in the common business environment while improving organisational capabilities for knowledge creation and transfer. HRM can work in the reinforcement theory as a behavioural modification method to shape learning behaviour by arousing motivation. Positive reinforcement is a powerful means to change behaviour and is more effective than punishment in learning activities (Robbins, 2005). At this

point, it is important to think of how HRM reinforces the positive changes of employees.

The HPCC reveals that the changes of employee attitudes and behaviour can be affected by how employees perceive HRM practices. It is an issue of emotional acceptance and clarifying why a practice is necessary for a specific organisational unit is important to resolve this issue. The top-down processing of HRM that does not consider idiosyncratic job characteristics in different functional subsidiaries may cause the dissatisfaction and negative reactions of employees. In other words, employees are likely to perceive HRM practices negatively when they are not designed to support employees on the basis of task types and work characteristics. For example, performance-based compensation will become ineffective if performance for each task cannot be measured correctly due to a particular work characteristic. By understanding employees and organisational challenges as a business player beyond a partner level, HRM can deliver employees practices that enable the business rather than merely support it (Ulrich and Beatty, 2001). For this reason, considering what kind of practices are more effective and supportive for employees is necessary when designing a well-customized HRM system. It means that HRM must pay attention to different tasks specifically based on the functional variation. This bottom-up consideration can positively facilitate the perception of practices in the HPCC and thus result in the positive change of employee attitudes and behaviour for knowledge outputs.

6.2.2 High Performance Work Practices in MNCs

HRM practices have typical forms that are widely applicable to organisations even though people use them in different ways. In particular, international HRM practices can be classified into three principal domains: talent management, performance management, and reward management (Stiles et al., 2006). General HRM practices such as recruitment, selection, training, goal setting, appraisal, and rewards constitute those three domains. However, many organisations are recently challenged in attracting talented people that have diverse backgrounds (Millmore et al., 2007). A more important fact is that diverse employees provide a wealth of experience and knowledge for firms when they are well managed in a favourable environment (Cavusgil et al., 2008). Cultural and environmental issues such as working conditions and diversity in the workplace can thus be important matters for managing employees. As a necessary consequence, HRM practices in the global environment can be reorganised for research into 'recruitment and staffing', 'training and development', 'planning and appraisal', 'compensation and benefits', and 'managing working conditions and diversity'.

There is a reason why HRM practices must be more specified. Traditional HRM practices have some issues such as salary loosely tied to performance, narrowly defined jobs, limited screening for non-managerial jobs, tight supervision, little training, and layoffs in slack times (Osterman, 2000). Therefore, more focused HRM practices such as team

structures for maximizing horizontal information flows, job rotation to build flexibility, team communication, training in problem solving, team skills, and incentive pay are needed for organisational performance. These practices foster worker ideas to raise productivity and make multi-tasking more successful (Ichniowski and Shaw, 2003). This matter has been studied in terms of high performance work practices or high performance HR practices. Innovative human resource practices (Ichniowski and Shaw, 2003), high commitment human resource practices (Batt et al., 2002), and high involvement human resource practices (Verma and Fang, 2003) have also been explored in the same vein.

When knowledge is viewed as an organisational project outcome, high performance work practices can be more important for R&D and marketing project teams. Incentive compensation, job security, training, job design, participation, communication, and flexible work arrangements must be observed with more attention (Huselid, 1995; Pfeffer, 1998; Sun et al., 2007; Zheng et al., 2006). My research employs these high performance work practices related to HRM areas indicated above as seen in Table 6.1. High performance work practices that support knowledge creation and transfer are investigated on the basis of the opinion of MNC employees. However, my research does not intend to look into these practices as independent variables. My focus is on how the bundles of these practices are configured in different sorts of MNC subsidiaries. For example, MNC employees respond to the question of how much each of high performance work practices supports knowledge creation and

sharing through MNC projects. Then the categorical differences of two sorts of MNC subsidiaries are analysed from the answers in clarifying the different patterns of them. Therefore, an investigation of whether HRM systems are configured differently in the two contexts, R&D and marketing, and why the result develops is performed in my research.

HRM Areas	High Performance Work Practices
Recruitment and Staffing	4 items
Planning and Appraisal	6 items
Compensation and Benefits	4 items
Training and Development	3 items
Working Conditions	6 items

Table 6.1. HRM Practices Examined

6.2.3 The Identification of an HRM System

Organisational configurational perspectives of HRM systems and fits need to be reviewed more in relation to the HRM configurations in R&D and marketing. The bundles of high performance work practices configured in different subsidiaries can be explored in these two concepts. Firstly, higher performance work practices may be applied differently to learning sites in terms of HRM systems. The concept of the 'HRM system' is important in inquiring into the HRM practices of organisations. They can be accompanied with particular combinations according to the organisational environment. HRM systems as the specific sets of HRM practices can be employed to accomplish organisational goals (Bowen and Ostroff, 2004). A universalist model of HRM argues that the similar sets of HRM practices are always able to lead to high performance.

Nevertheless, much more scholars in HRM research believe that a distinctive set can be constructed on the basis of a specific and distinct condition in different work groups (Becker and Gerhart, 1996). The HRM system thus reveals a combined effect of interrelated HRM practices effective under different circumstances (Bae and Lawler, 2000; Guthrie, 2001; Huselid et al., 1997; Wright and Snell, 1998).

At this time, a particular fit with the organisational strategy is required for the combined effect toward the same direction (Milliman et al., 1991; Wright and Snell, 1991). In terms of the 'content' and 'process' of the HRM system, understanding the HRM system does not only implicate what practices affect outcomes but also how HRM can send necessary signals to employees for desired responses (Bowen and Ostroff, 2004). Desired responses will be the positive changes of employee attitudes and behaviour in the HPCC mentioned above. The process is thus an effective technique that means how to enlighten employees about the content of an HRM system. However, a reasonable and effective approach can be more important when contents are identified rather than when they are delivered. This is because HRM practices are not optional subjects but more enforced rules. When contents are constructed fairly and reasonably, employees are able to understand them more easily.

The foregoing facts show that HRM systems are understood under the different circumstances of knowledge creation and transfer. The relationships of practices that shape HRM systems must thus be reviewed in context. There is another reason why context should be

considered when HRM systems are explored in organisations. Systems theory has often been mentioned in organisational studies in conjunction with environmental impact (Donaldson, 1987). According to that, organisations are open systems that interact with their environment as parts of social systems (Donaldson, 2001; Drazin and Van de Ven, 1985; Keller, 1994). This means that the outputs of organisations can be different depending on environmental conditions even though their inputs are the same. For this reason, understanding various contexts prevents a false idea of organisational relationships in the HPCC so that organisations can know what they must do to survive environmental changes. HRM in the open system, therefore, explains exchanges with the surrounding environment in the causal chain from practices to outcomes. Consideration of organisational contexts can increase the explanatory power of HRM research (Fleetwood and Hesketh, 2006; Truss, 2001).

6.2.4 Internal Fit of HRM: HRM Configurations in R&D and Marketing

In the organisational contingency perspective, the effects of national, industrial, and organisational contexts have been investigated in MNC HRM research (Bhagat et al., 2002; Bloom and Michel, 2002; Fleetwood and Hesketh, 2006; Hyde et al., 2009; Jackson and Schuler, 1995; Wright et al., 2005b). Contingency-based external fit is revealed from many of the HRM studies causally related to MNC knowledge transfer (Guest, 1997). My research, however, focuses more on the internal fit of HRM associated with organisational contexts. There are

four types of the internal and external fits of HRM identified by Guest (1997) as indicated in Table 6.2. The internal fit of HRM explored in my research is located in the middle of the fit into an ideal set of practices and fit as bundles in the table. When the internal HRM fit is investigated, an ideal set of practices is initially identified and then the method to get closer to the ideal set is explored. A criterion-specific contingency approach is applied into the internal fit in this case and the ideal set can be used widely across firms. This fit is not based on the contingency perspective and the derived set is universally effective.

	Criterion Specific	Criterion Free
Internal Fit	Fit to an ideal set of practices	Fit as bundles (gestalt)
External Fit	Fit as strategic interaction	Fit as contingency

Table 6.2. Types of HRM Fit by Guest (1997)

Another type of internal fit pays more attention to distinctive configurations of HRM. In this approach, a bundle of HRM practices is effective in a specific area or an organisation (Guest, 1997). For example, a previous study by Hocking et al. (2007) reveals specific combinations of knowledge access and communication modes of expatriates in the internal context of an MNC foreign subsidiary located in Australia. At this time, knowledge access and communication modes are a bundle of best HRM practices and how they become more effective in sample organisations are explored. Such an internal fit concentrates on the organisational contexts and micro level factors of HRM systems (Bae and Rowley, 2001; Smale, 2008). HPWP stated above is an ideal set of practices

generally accepted by several firms, but they can be distinctive patterns according to functional differences such as marketing and R&D in my research. It means looking into the effective configurations of significant HRM practices that previous studies have addressed, whereby differentiated HRM settings that fit the different types of MNC subsidiaries can be unveiled.

On the basis of the theoretical background of these four sections, HRM practices perceived by R&D researchers and marketers are compared in my research. The main hypothesis is "*Marketing and R&D of MNCs reveal different configurations of HRM practices*." This is examined in six categories of HRM practices previously-reviewed: 'recruitment and staffing', 'training and development', 'planning and appraisal', 'compensation and benefits', and 'managing working conditions and diversity'. At this time, high performance work practices introduced in previous studies such as Minbaeva et al. (2003), Ngo et al. (1998), and Zheng et al. (2006) are observed more carefully. Although HRM practices have been regarded differently as high-involvement, high-commitment, high-performance, and sophisticated work practices in previous studies (Guthrie, 2001), performance-related HRM practices are specifically focused on due to looking into knowledge as project outcomes in my study. Then the distinctive configurations of HRM practices according to the functional variation of R&D and marketing are explored. What specific features result in the difference between functional configurations is most importantly investigated.

This chapter wanted to more inductively investigate how high performance work practices are classified into R&D and marketing rather than testing limited hypotheses. However, there was a possibility that the discussion might lose its focus and flow in a wrong direction when my research did that. To prevent that from happening, this chapter focused on some issues related to team work because previous chapters treated team relationships in MNC projects. Three main points will lead this chapter into consistent discussion as a result. Firstly, non-pecuniary benefits help high-productivity workers to join teams (Hamilton et al., 2003). Therefore, the use of financial incentives and non-financial benefits in R&D and marketing will be explored. Second, group-based pay is good for team performance but causes some problems such as free riders (Ichniowski and Shaw, 2003). The different use of individual and group-based HRM settings will be important in this chapter as well. Finally, role-making in leader-member dyads and relevant job design are important for team satisfaction (Graen et al., 1982). How differently routine work and roles are designed in R&D and marketing will also be the focus of this chapter. The ultimate interest of my research is the formation of different HRM systems based on the perception of employees rather than the effect of HRM practices, as seen in Figure 6.1.

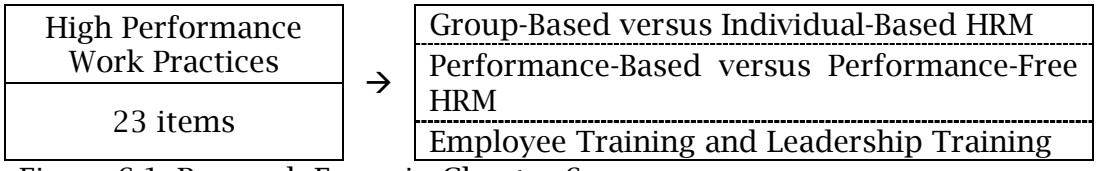


Figure 6.1. Research Focus in Chapter 6

The main hypothesis that builds this chapter in respect of different R&D and marketing HRM systems is thus:

H 6 (Main Hypothesis). The work contexts of R&D and marketing cause distinctive patterns of HRM practices in their subsidiaries.

Some more sub-hypotheses are constructed from findings in the previous two chapters and pre-interviews rather from literature review. Firstly, local and cross-national team task interdependence was explored in Chapter 5 and 6. It can cause the need of team task settings based on group responsibilities. In particular, when team task interdependence becomes higher in an MNC project, valuing group responsibilities above individual responsibilities is expected to be greater. If team task interdependence becomes lower, valuing group responsibilities above individual responsibilities can be lower. These priorities of group responsibilities and individual responsibilities in MNC projects are explored with following two hypotheses.

H 6.1. There is a difference between R&D and marketing project subsidiaries in terms of valuing group responsibilities above individual responsibilities.[35]

[35] A 1-tailed test is performed when a null hypothesis is set as "The mean of R&D is greater (or smaller) than a SPECIFIC VALUE in valuing group responsibilities." In this section, my research examines differences between the means of R&D and

H 6.2. There is a difference between R&D and marketing project subsidiaries in terms of valuing individual responsibilities above group responsibilities.

Secondly, task interdependence can make individual performance hard to measure. This is because task interdependence causes the unclearness of how much someone has contributed to an outcome. In this condition, performance-based pay cannot be effective to motivate project members. Performance-free financial incentives and non-financial benefits may have to be more strengthened in this case. Performance-based pay and performance-free financial or non-financial benefits are thus examined with following two hypotheses.

H 6.3. There is a difference between R&D and marketing project subsidiaries in terms of using performance-based pay to support knowledge creation and sharing.

---

marketing regarding the dependent variable (group responsibilities). Even if the hypothesis intends to examine whether R&D is greater than marketing in group responsibilities, this verification is not a 1-tailed test but a 2-tailed *t* test. This is because the hypothesis is not a bigger or smaller relationship with a SPECIFIC VALUE. For example, a 1-tailed test can be performed to verify whether the SAMPLE survey result, which the mean of R&D is greater than 3 in valuing group responsibilities, will be significant in POPULATION. My hypotheses are not about a specific mean value but about the differences between means of two groups. My research surely has virtual hypotheses of "R&D is greater (or smaller) than marketing." To prevent the confusion of readers, this thesis uses the hypotheses terms of 'a difference between' related to 2-tailed tests rather than 'greater than' or 'smaller than'.

H 6.4. There is a difference between R&D and marketing project subsidiaries in terms of using performance-free financial or non-financial benefits to support knowledge creation and sharing.

Third, work reporting and leadership types were previously investigated. Individual or collaborative reporting and maintenance leadership or task leadership can be supported by appropriate HRM settings. In my expectation, short-term-based individual reporting can clarify the limits of individual ability more so that training programmes for the development of individual capabilities can be implemented more actively. In addition, maintenance leadership can be developed more easily in a short time compared to task leadership. This is because task leadership requires more specialized skills and experiences that should be accumulated over a long period of time. Two hypotheses regarding employee training and leadership training are thus developed as follows.

H 6.5. There is a difference between R&D and marketing project subsidiaries in terms of using employee training for new skills to support knowledge creation and sharing.

H 6.6. There is a difference between R&D and marketing project subsidiaries in terms of using leadership training for project management to support knowledge creation and sharing.

According to the configurational approach of HRM systems, HRM practices should be aligned and bundled internally to create better organisational outcomes (Ferris et al., 2002; MacDuffie, 1995; Youndt et al., 1996). Comparisons among tasks, work structures, or skill levels make a specific architecture of HRM practices internally-consistent (Milkovich and Newman, 2008). Investigating the attributes of tasks and work structures is thus necessary for the understanding of HRM systems configured. Previous chapters specifically explore team relationships in knowledge creation and transfer processes. For this reason, individual versus group responsibilities, financial versus non-financial incentives, and training focus have been investigated mainly.

6.3 Results

Survey and interview results reveal that marketing and R&D subsidiaries differently set HRM systems for project outcomes. To test whether differences between marketing and R&D exist in HRM practices, a multi-way MANOVA analysis was performed. Functional and industrial differences as independent variables were examined with the dependent variables of HRM practices at this time. Data through the questionnaire survey and additional interviews were previously provided for this analysis. Twenty-two measurement items were specifically derived from previous studies mentioned above for an HRM section of the survey questionnaire. Then they were analysed through valid quantitative and qualitative methods as described in the methodology chapter. As a result,

the following three settings tend to shape distinctive HRM systems in marketing and R&D subsidiaries. These indicate the internal fit of HRM practices and the other strategic setting that interacts with contextual sectors is additionally explained next.

6.3.1 HRM Focus Identified through Main Hypotheses

As already stated, this chapter investigates the configurations of bundled high performance HRM practices in R&D and marketing subsidiaries. All high performance HRM practices distracted from previous studies are thus examined to observe how they differently or similarly form bundles in R&D and marketing. Before doing that, this section tests six hypotheses with key dependent variables regarding HRM differences. Hypotheses are verified in unpaired (independent samples) t-tests to investigate whether the difference between the two samples' averages is statistically significant.

These tests are conducted under the assumption that the variances of two populations are equal ($\sigma 12 = \sigma 22$), but separated statistics are given for the case to see if the assumption is rejected. For example, Table 6.3 shows two different cases that the assumption is rejected or not. The first p-statistic in the Levene's test is 0.656, which is greater than 0.05 (the conventional 5% level). It means that $\sigma 12 = \sigma 22$ cannot be rejected, so the assumption of equal variances is valid. Statistics according to the equal variances assumption are used at this

time. However, the second one uses statistics for the case that equal variances are not assumed because the p-statistic is lower than 0.05.

6.3.1.1 Group-Based HRM

This part examines the differences between R&D and marketing subsidiaries regarding Hypothesis 6.1.[36] It deals with a distinction in valuing group responsibilities above individual responsibilities for projects. The test result of Hypothesis 6.1 reveals that the degree of valuing group responsibilities above individual responsibilities is higher in R&D than in marketing as described in Table 6.3.[37] This fact means that R&D organisations prefer group responsibilities to individual responsibilities when a project is designed. Focusing more on group-based HRM settings can be effective to support the R&D knowledge process for this reason.

		N
Function	R&D	278
	Marketing	280

H 6.1 to H 6.2	$\sigma_1^2 = \sigma_2^2$		*T*	*Df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Group Responsibilities (Q'naire *4B-5)*	.656	Assumed	-9.589	556	.000	R&D	3.71	-.858	-.566
						MKTG	2.99		

[36] Measurement items for Hypothesis 6.3 to 6.6 come from the items of high performance work practices identified in previous studies. However, measurement items Hypothesis 6.1 and 6.2 are newly constructed on the basis of individual or group work structures identified in previous empirical chapters.

[37] How survey respondents have been asked about this variable is seen in the attached survey questionnaire. 4B-5 and 4B-6 in Table 6.3 indicate the question numbers of the questionnaire. Measurement items for these two were developed from pre-interviews and other four were gained from high performance HRM practices.

Individual Responsibilities (Q'naire *4B-6)*	.001	Not Assumed	5.817	555.038	.000	R&D MKTG	3.03 3.48	.303	.611

Table 6.3. Univariate Effects of Functions (at $p < 0.05$ level) – Individual and Group Responsibilities

6.3.1.2 Individual-Based HRM

Table 6.3 also reveals the differences between R&D and marketing subsidiaries regarding Hypothesis 6.2. It deals with a distinction in valuing individual responsibilities above group responsibilities for projects. The test result of Hypothesis 6.2 reveals that the degree of valuing individual responsibilities above group responsibilities is higher in marketing than in R&D as described in Table 6.3. This fact means that marketing organisations prefer individual responsibilities to group responsibilities when a project is designed. Focusing more on individual-based HRM settings can be effective to support the marketing knowledge process as a result.

6.3.1.3 Performance-Based HRM

This section verifies the differences between R&D and marketing subsidiaries regarding Hypothesis 6.3. It examines a distinction in whether performance-based pay supports knowledge creation and sharing in MNC projects. The test result of Hypothesis 6.3 reveals that the support of performance-based pay for knowledge creation and sharing is higher in marketing than in R&D as described in Table 6.4. This fact means that performance-based pay supports the marketing knowledge

process more. Focusing more on performance-based appraisal, compensation, and relevant HRM settings can be effective to support marketing employees for this reason.

		N
Function	R&D	278
	Marketing	280

H 6.3 to H 6.4	$\sigma_1^2 = \sigma_2^2$		*T*	*Df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Performance-Based (Q'naire *4C-1)*	.469	Assumed	9.565	556	.000	R&D	3.04	.670	1.016
						MKTG	3.89		
Non-Performance-Based (Q'naire *4C-4)*	.026	Not Assumed	-7.926	549.423	.000	R&D	3.59	-.865	-.522
						MKTG	2.89		

Table 6.4. Univariate Effects of Functions (at $p < 0.05$ level) – Performance -Based and Performance-Free HRM

6.3.1.4 Performance-Free HRM

Differences between R&D and marketing subsidiaries regarding Hypothesis 6.4 are mentioned in Table 6.4 as well. It examines a distinction in whether various benefits are provided to compensate imperfect performance appraisals for knowledge creation and sharing. The test result of Hypothesis 6.4 reveals that the degree of various benefits to compensate imperfect performance appraisals is higher in R&D than in marketing as described in Table 6.4. R&D employees feel that performance appraisals are not very effective for the knowledge process and thus other benefits are necessary according to the result. Focusing more on performance-free benefits rather than performance-based pay can be effective to support the R&D knowledge process as a result.

6.3.1.5 Employee Training

The differences between R&D and marketing subsidiaries regarding Hypothesis 6.5 are tested here. It considers a distinction in whether training programmes are provided for employees to learn new skills required for specific projects. The test result of Hypothesis 6.5 reveals that the degree of training programmes provided for employees' new skills is higher in marketing than in R&D as described in Table 6.5. This fact means that employee skill training is more required for marketing projects. Focusing more on employee skill training can be effective to support the marketing knowledge process for this reason.

		N
Function	R&D	278
	Marketing	280

H 6.5 to H 6.6	$\sigma_1^2 = \sigma_2^2$		*T*	*Df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Employee Training (Q'naire *4D-2)*	.083	Assumed	9.547	556	.000	R&D	2.94	.630	.956
						MKTG	3.74		
Leadership Training (Q'naire *4D-3)*	.150	Assumed	-4.847	556	.000	R&D	3.59	-.523	-.221
						MKTG	3.22		

Table 6.5. Univariate Effects of Functions (at $p < 0.05$ level) – Employee Skill and Leadership Training

6.3.1.6 Leadership Training

Leadership Training is another variable to observe the difference between R&D and marketing subsidiaries. Table 6.5 shows independent samples t-test results regarding Hypothesis 6.6. It examines a distinction in whether leadership training programmes are provided for effective project management. The test result of Hypothesis 6.6 reveals that the

degree of leadership training programmes for project management is higher in R&D than in marketing as described in Table 6.5. R&D leaders rather than marketing leaders are involved in leadership training programmes. Focusing more on leadership training rather than employee skill training can be effective to support the R&D knowledge process as a result.

These results imply that R&D and marketing subsidiaries have different HRM focus to support their knowledge processes. To examine their HRM details, next sections consider the following. 1) T-tests intended for all of higher performance work practices are performed to investigate what sorts of high performance HRM practices are preferred in each function. 2) Factor analysis and reliability analysis are performed to review if high performance HRM practices classified into each section have any correlational features. 3) Multivariate analyses are performed to figure out the effect of sectors, team size, and the country of origin.

6.3.2 Bundles of High Performance Work Practices

The six categories of HRM mentioned above are helpful for the understating of the differences between R&D and marketing, and these settings will be discussed again. Before doing this, it is important to verify whether HRM practices are configured in R&D and marketing subsidiaries. To investigate whether the bundles of high performance HRM practices appear in R&D and marketing subsidiaries, this section examines univariate effects of the functional group on twenty-three

practices. Effects on sixteen high performance HRM practices among them are significant at the 95% confidence level as seen in the following table. Effects on seven items are not significant at the 5% level and thus are not presented in this table.

		N
Function	R&D	278
	Marketing	280

High Performance Work Practices	$\sigma_1^2 = \sigma_2^2$		*T*	*Df*	*Sig. (2-tailed)*	Groups	Means	95% Confidence Interval	
	Sig.	Equal Variance						Lower	Upper
Promotion/Selection for Vacant Positions (Q'naire 4A-2)	.019	Not assumed	-2.348	544.421	.019	R&D	3.51	-.328	-.029
						MKTG	3.33		
Merit-Based Promo. (Q'naire 4A-3)	.000	Not assumed	-10.163	509.465	.000	R&D	3.70	-.956	-.647
						MKTG	2.90		
Accurate Job Descr. (Q'naire 4B-1)	.133	Assumed	-2.594	556	.010	R&D	3.53	-.339	-.047
						MKTG	3.33		
Formal Performance Appraisal (Q'naire 4B-2)	.027	Not assumed	12.648	552.634	.000	R&D	2.90	.869	1.189
						MKTG	3.93		
Group Resp's.[38] *(Q'naire 4B-5)*	.656	Assumed	-9.589	556	.000	R&D	3.71	-.858	-.566
						MKTG	2.99		
Individual Resp's. (Q'naire 4B-6)	.001	Not assumed	5.817	555.038	.000	R&D	3.03	.303	.611
						MKTG	3.48		
Performance-Based Pay (Q'naire 4C-1)	.469	Assumed	9.565	556	.000	R&D	3.04	.670	1.016
						MKTG	3.89		
Various Benefits (Q'naire 4C-4)	.026	Not Assumed	-7.926	549.423	.000	R&D	3.59	-.865	-.522
						MKTG	2.89		
Training Opp. (Q'naire 4D-1)	.065	Assumed	10.014	556	.000	R&D	2.92	.681	1.013
						MKTG	3.77		
Training Prgm. for New Skills (Q'naire 4D-2)	.083	Assumed	9.547	556	.000	R&D	2.94	.630	.956
						MKTG	3.74		
Leadership Training Programs (Q'naire 4D-3)	.150	Assumed	-4.847	556	.000	R&D	3.59	-.523	-.221
						MKTG	3.22		
Closely Working with Team Members (Q'naire 4E-1)	.004	Not assumed	-6.444	546.460	.000	R&D	3.74	-.627	-.334
						MKTG	3.26		

[38] 4B-5 and 4B-6 are not direct measurement items for high performance work practices but have a possibility that they are linked to high performance on the basis of Ichniowski and Shaw (2003).

Communication with Managers (Q'naire 4E-3)	.655	Assumed	4.902	556	.000	R&D	2.97	.218	.511
						MKTG	3.33		
Communication b/w Team Members (Q'naire 4E-4)	.004	Not assumed	-10.800	533.041	.000	R&D	3.71	-.985	-.682
						MKTG	2.88		
Job Security (Q'naire 4E-5)	.006	Not assumed	-11.908	539.919	.000	R&D	3.72	-1.075	-.771
						MKTG	2.79		
Grievance·Complaint Resolution (Q'naire 4E-6)	.047	Not assumed	-11.625	546.072	.000	R&D	3.62	-1.028	-.731
						MKTG	2.74		

Table 6.6. Univariate Effects of Functions (at $p < 0.05$ level) – HRM Fit[39]

In Table 6.6, R&D shows greater effects on ten practices: internal promotion and selection for vacant positions, merit-based promotion, accurate job description by formal job analysis, group responsibilities, performance-free benefits, leadership training, closely working with team members, communication system, job security, and grievance and complaint resolution system. Marketing shows greater effects on six practices: formal appraisal system, individual responsibilities, performance-based pay, sufficient opportunities for training, employee skill training, and communications with managers. This result can be understood more easily with Table 6.7. Different high performance HRM practices that support R&D and marketing knowledge processes are separately classified here.

	R&D	Marketing
Sets of HRM Practices	4A-2 4A-3 4B-1 4B-5	4B-2 4B-6 4C-1 4D-1

[39] Twenty-three HRM practices were examined. Among them, 4A-1, 4A-4, 4B-3, 4B-4, 4C-2, 4C-3, and 4E-2 were removed because they are not significant at the 5% level.

	4C-4 4D-3 4E-1 4E-4 4E-5 4E-6	4D-2 4E-3

Table 6.7. High Performance Work Practices Supportive for R&D and Marketing Projects

All practices mentioned in Table 6.7 are HRM practices that result in high performance but differently used in R&D and marketing. A question arises at this point regarding why those specific practices shape each group. To reach an answer through their correlational structures, factor analysis and reliability analysis are performed.

6.3.3 Correlations among Bundled High Performance HRM Practices

Factor analysis identifies underlying dimensions or factors, which explain the correlations among variables that form a set. The information about interdependencies between measured variables is used to identify new sets of variables (Morrison, 1976; Thompson, 2004). In relation to regression analysis, factor analysis has been performed frequently to replace the sets of correlated original variables to uncorrelated independent variables for a regression. Several variables pre-defined from previous studies can be reduced to a small number of new variables in that case.

This section, however, performs a factor analysis independently from other statistical analyses. The objective is to figure out the relation

of high performance work practices bundled in each R&D and marketing by identifying the sets of high performance work practices used for the same purposes. Correlated practices are grouped together and separated from other practices with low or no correlation through the factor analysis. Therefore, what sorts of correlational factors the R&D or marketing bundle of high performance HRM practices has is explored to find out the internal structure of each HRM bundle. For example, Table 6.7 shows that ten high performance HRM practices are important for the R&D knowledge process. The correlational structure of these ten practices can be identified through the factor analysis.

N = 558

	Component		
	R&D		Marketing
	1	2	1
4E-4	.777	.207	
4E-6	.774	.254	
4E-5	.757	.250	
4B-5	.736	-.156	
4E-1	.614	.259	
4B-1	.043	.767	
4A-2	.046	.746	
4D-3	.357	.619	
4A-3	.550	.553	
4C-4	.512	.543	
4D-1			.854
4D-2			.838
4C-1			.829
4B-2			.821
4E-3			.613
4B-6			.505

- Factor Loading Values
- Rotation Method: Varimax with Kaiser Normalization

Table 6.8. Factor Analysis – High Performance Work Practices

This factor analysis provides information about why some specific practices form a bundle in R&D and others form another bundle in marketing. The analysis result indicates that high performance HRM

practices used in R&D can be classified into two dimensions. High performance HRM practices used in marketing converge on the only one factor as seen in Table 6.8. Two factors in R&D are identified as more work environmental support and more work procedural support. These two are apt to result from the different reactions of survey respondents to more indirect support and more direct support. More importantly, their features clearly reveal the link of group-based HRM to non-financial benefits and performance-free benefits to leadership training. Group-based settings, non-financial or performance-free benefits, and leadership training can thus have a complementary effect. In contrast, individual-based HRM, performance-based pay, and employee skill training are clearly correlated in the only factor of marketing. Using these three together can result in a complementary effect in marketing. The point is that they are not a loose mix but a cohesive bundle that can create a synergetic effect.

In addition, the result of reliability analysis indicates that high performance HRM practices that shape each factor are internally consistent. The alpha values are high enough for a survey-based study on the basis of George and Mallery (2003). In the last factor of Table 6.9, removing 4B-6 and 4E-5 can increase the alpha value. However, the difference is not big and the alpha value with them is high as 0.846. These two practices are still significant in forming the last factor for the reason. There are two additional points. 1) R&D and marketing have the distinctive settings of training programmes. 2) The importance of

accurate job descriptions and managing vacant job positions is figured out in R&D. Why these distinctive figures appear must be explored in the next section. The next section compares the attributes of high performance HRM practices in R&D and marketing to clarify why they form a bundle.

Reliability Analysis – Scale (Alpha)
Correlation Matrix

N = 558

R&D HPWP Component 1

	4E-4	4E-6	4B-5	4E-5	4E-1	Alpha if Item Deleted
4E-4	1.000					.763
4E-6	.593	1.000				.762
4B-5	.405	.418	1.000			.817
4E-5	.616	.622	.398	1.000		.762
4E-1	.446	.441	.354	.432	1.000	.807

- Reliability Coefficients: 5 Items
- Alpha = 0.819, Standardized Item Alpha = 0.817

R&D HPWP Component 2

	4B-1	4A-2	4D-3	4A-3	4C-4	Alpha if Item Deleted
4B-1	1.000					.745
4A-2	.381	1.000				.750
4D-3	.366	.336	1.000			.729
4A-3	.376	.406	.445	1.000		.697
4C-4	.360	.317	.448	.566	1.000	.715

- Reliability Coefficients: 5 Items
- Alpha = 0.770, Standardized Item Alpha = 0.769

Marketing HPWP Component 1

	4B-2	4B-6	4C-1	4D-1	4D-2	4E-3	Alpha if Item Deleted
4B-2	1.000						.803
4B-6	.339	1.000					.862
4C-1	.673	.382	1.000				.801
4D-1	.615	.308	.648	1.000			.795
4D-2	.595	.337	.574	.710	1.000		.799
4E-3	.390	.138	.375	.454	.474	1.000	.847

- Reliability Coefficients: 6 Items
- Alpha = 0.846, Standardized Item Alpha = 0.840

Table 6.9. Reliability Analysis – High Performance HRM Practices

6.3.4 Attributes of Different Bundles in R&D and Marketing

6.3.4.1 The First Difference between R&D and Marketing

Performance-Free and Non-Financial Benefits in R&D versus Performance-Based Incentives in Marketing

Statistics in above tables mainly indicate differences between marketing and R&D in five points significant at the 5% level ($\alpha = 0.05$). First, merit-based promotion supports knowledge creation and sharing in R&D rather than in marketing subsidiaries. Second, internal promotion or selection to fill vacant positions supports knowledge creation and sharing in R&D rather than in marketing subsidiaries. Third, various benefits are provided to compensate imperfect performance appraisals in R&D rather than in marketing subsidiaries. Fourth, a formal performance appraisal system supports knowledge creation and sharing in marketing rather than in R&D subsidiaries. Finally, performance-based pay supports knowledge creation and sharing in marketing rather than in R&D subsidiaries. The first three facts are greater in R&D and the next two things are greater in marketing in their statistics. With interview results, these facts can be developed further in showing how they are relevant.

As an individual motivation tool, non-performance-based HRM practices appear more important in R&D, whereas performance-based HRM practices appear more important in marketing. Non-financial benefits are more effective for R&D projects but financial rewards are more effective for marketing projects. There is a reason why different types of HRM settings are required for marketing and R&D. It is easy to think that R&D researchers are apt to be motivated by high compensation. This is because the average salary of R&D researchers is generally higher than that of marketers. However, this is about a non-performance-based basic salary and means that R&D researchers earn more without

considering outcomes. According to interview results, R&D researchers tend to feel that the level of individual compensation is unfair in many cases. Several members work together for a knowledge set and this knowledge set is the only factor that can prove their performance. In this situation, a relative free-rider or a lower-level contributor gains the same compensation based on group performance. Because group responsibilities are based on reciprocal interdependent outcomes, performance-based compensation is not very effective at this time. In contrast, marketers have a lower salary but they have opportunities to get financial rewards based on clearer individual performance.

In addition, there is a time issue related to performance appraisal. Time taken to deliver a project outcome to the market and to get a response from customers is relatively short in marketing. For this reason, it is not difficult to evaluate the performance of marketers by a clear numerical criterion. In the case of R&D, it normally takes two or three years to release newly-developed technology to the market. The new technology may become successful or not after a few years and the answer can be gained by the future response of customers linked to sales profits. It is not very easy to evaluate the year-based performance of R&D researchers for this reason. Compensation by group-based performance is high and thus makes R&D employees satisfied. Nevertheless, they are not likely to be satisfied enough with it because they cannot be compensated as much as they contribute to a project. Non-performance-related practices such as merit-based promotion, internal promotion or selection

to fill vacant positions, and various benefits to compensate imperfect performance appraisals are thus preferred in R&D. In addition, providing supportive work environment in R&D subsidiaries makes up for the weak points of non-performance-based compensation. More statistics reveal that job security policies support knowledge creation and sharing in R&D rather than in marketing as well as a formal grievance or complaint resolutions system supports knowledge creation and sharing in R&D rather than in marketing. On the other hand, performance-related practices such as a formal performance appraisal system and performance-based pay are preferred in marketing.

Qualitative data explained in Section 6.3.4.1 and 6.3.4.2 is as follows. When interviewees were asked about group tasks and compensation, an R&D employee answered:

> We have a lot of overlapped responsibilities and have to help each other (MNC 1C-4).

> Individual compensation may not be very reasonable or fair (pause) because two, three, or more people are placed for the same output. Their individual output will not be very clear in this case.

> Because we work together (pause), we are looking at group compensation. But I think work environment and non-financial benefits are more important (MNC 3C-2).

> Yes, benefits are more helpful, absolutely (MNC 2C-2).

> Our pay level is high enough. I like work supporting systems and programmes rather than individual compensation (MNC 1C-3).

> Work environment and atmosphere are more important (MNC 4C-3).

In contrast, marketing employees felt somewhat differently as illustrated in the following comments:

> Individual performance and compensation is very helpful for me to motivate myself. It is a good opportunity to earn more money (MNC 2D-1).

> I think our pay level is lower than the R&D pay level, but we can earn more through compensation (MNC 3D-1).

Yes, our outcome can be measured with numbers such as sales profit and market shares. Our organisation will compensate individuals according to the outcomes (MNC 1D-1).

6.3.4.2 The Second Difference between R&D and Marketing

Team-Based Appraisal in R&D versus Individual-Based Appraisal in Marketing

Statistics seen in tables also reveal another finding related to individual and group-based HRM practices. Regarding assigning job responsibilities, it indicates that tasks tend to be designed on the basis of team responsibilities in R&D, whereas they are more based on individual responsibilities in marketing. According to test results, R&D organisation values group responsibilities above individual responsibilities. A dependent co-work style based on group responsibilities is preferred in R&D projects. In contrast, marketing organisation values individual responsibilities above group responsibilities. More independent tasks assigned with individual responsibilities are preferred in marketing projects even if they are performed in a co-work structure.

There is an issue that results from group-based HRM continuous task errors and trials by ineffective co-work structures between teams or free riders. In relation to this issue, test results in Table 6.6 show two important things. Firstly, tasks need to be designed more sophisticatedly in R&D than in marketing subsidiaries. Second, an accurate job description by formal job analysis supports knowledge creation and

sharing in R&D rather than in marketing subsidiaries. These two facts reveal that job design should be more sophisticated and accurate for each team or each member when highly-interdependent tasks are assigned to multiple teams for a project. By doing so, R&D can reduce time or cost inefficiency that occurs by a group-based HRM setting. If individual tasks are poorly designed, not only a team but also other teams are seriously damaged because tasks are highly-interdependent across teams. In addition, an internal competition system is designed to prevent employees from being discouraged by the group-based compensation in R&D. Table 6.13 indicates that a project team competes with other R&D subsidiaries in the same project. If an R&D outcome produced by an R&D subsidiary is not satisfactory, it will be rejected and a better outcome from another subsidiary will be chosen by HQ. The group performance becomes 0 at this point and R&D researchers will be disappointed because they cannot receive any compensation.

6.3.4.3 The Third Difference between R&D and Marketing

Self-Managed Daily Work and Employee Training in R&D versus Leader-Managed Daily Work and Leadership Training in Marketing

Training issues of HRM accompanied by functional differences are also seen in Table 6.6. Sufficient opportunities for training and development support knowledge creation and sharing in marketing rather than in R&D. The test result also reveals that training programs are provided for employees to learn new skills in marketing rather than in

R&D. As a result, marketing HRM focuses more on developing the individual capabilities of marketers, whereas R&D HRM focuses more on recruiting talented and previously-trained employees at the non-managerial level. Marketing subsidiaries also recruit some experienced and trained people, but this recruiting tends to be intended for managerial positions. In contrast, the recruiting of R&D subsidiaries is normally intended for various positions that require professional skills and knowledge across both lower and higher levels. In this situation, leadership training becomes important as the test result for 4D-3 shows.

A point is that employee training programmes must be provided in a long-range view, whereas leadership training programmes can be developed in a short-term view. Returning to Chapter 5, task leadership is more important for marketing leaders but maintenance leadership is more important for R&D leaders. Task leadership has to be based on specialized skills and good experiences. For this reason, marketing subsidiaries tend to recruit highly experienced people as leaders. This situation decreases the importance of leadership training programmes in marketing. In contrast, low-level R&D researchers normally have specialized skills and experiences and thus the main role of R&D leaders is to support them well. This sort of supporting skills related to maintenance leadership can be developed more easily in short-term leadership training.

The other test results show that managing relationships between managers and members is more important in marketing than in

R&D. As described in Table 6.6, reducing differentials between managers and other employees for effective communications supports knowledge creation and sharing in marketing rather than R&D subsidiaries. This fact means that a problem in project outcomes can happen when low-level employees cannot communicate with team leaders in marketing. Effectively arranging and managing the tasks of team members is important as the main role of marketing leaders.

One of the statistics indicates that formal communication programs linking employees to the firm support knowledge creation and sharing in R&D rather than in marketing subsidiaries. This fact means that communication between low-level employees is easier in R&D, whereby a disagreement of opinion between employees is likely to be settled without a big hardship. On the other hand, in marketing, team leaders need to resolve project-related disagreements that occur between teams when members from different teams work together. This is because the face-to-face co-work of members is less frequent in marketing. The role of marketing managers as a co-work coordinator becomes more important in a joint project. At this point, marketing leaders need task-related skills in the middle of autocratic and democratic (participative) leadership. R&D leaders need maintenance-related skills in the middle of the democratic (participative) and delegative (laissez-faire) leadership. The following Table 6.10 summarizes the above findings that shape this chapter.

HRM Focus	R&D	Marketing
Recruiting	Highly experienced employees throughout the levels	Non-career employees for the lower level and experienced employees for the managerial level
Basic Pay Level	High	Medium
Appraisal	Group-based	Individual-based
Incentives	Focusing more on performance-free / non-financial benefits	Focusing more on performance-based incentives
Job Design	Self-managed daily work supported by maintenance leadership (democratic-delegative)	Leader-managed daily work supported by task leadership (autocratic-democratic)
Training	Leadership training	Employee skill training

Table 6.10. Different HRM Focus in R&D and Marketing[40]

6.3.5 Team Size and Project Time Taken

Table 6.11 shows the effect of an industrial difference identified by a multi-way MANOVA. The effects of the ICT industry are generally greater than the effects of the automobile industry, across R&D and marketing as seen in the table. Automobile teams are normally bigger than ICT teams and thus different team size has been expected and investigated as a reason for the ICT effects.

		N
Function	R&D	278
	Marketing	280
Industry	ICT	368
	Automobile	190

DV	IV			*df*	Mean Square	*F*	Sig.	Effect Size
	Variables	Alternatives	Mean					
Merit-Based Promotion (4A-3)	Function	R&D	3.70	1	95.303	111.182	.000	.167
		Marketing	2.90					
	Industry	ICT	3.33	1	5.355	6.248	.013	.011
		Automobile	3.24					
	F. X I.	ICT-R&D	3.71	1	3.819	4.455	.035	.008
		Auto-R&D	3.68					
		ICT-Marketing	3.01					
		Auto-Marketing	2.63					
Performance Appraisal (4B-2)	Function	R&D	2.90	1	129.661	140.491	.000	.202
		Marketing	3.93					
	Industry	ICT	3.50	1	1.857	2.012	.157	.004

[40] The findings are based on the perceptions of R&D and marketing Employees. The leadership styles of autocratic, democratic (Participative), and delegative (laissez-faire) leaders are introduced in Goodnight (2004).

		Automobile	3.25					
	F. X I.	ICT-R&D	2.96	1	.154	.167	.683	.000
		Auto-R&D	2.80					
		ICT-Marketing	3.95					
		Auto-Marketing	3.86					
Performance-Based Pay (4C-1)	Function	R&D	3.04	1	80.015	74.437	.000	.118
		Marketing	3.89					
	Industry	ICT	3.58	1	6.272	5.834	.016	.010
		Automobile	3.25					
	F. X I.	ICT-R&D	3.12	1	.143	.133	.715	.000
		Auto-R&D	2.93					
		ICT-Marketing	3.96					
		Auto-Marketing	3.70					
Various Benefits (4C-4)	Function	R&D	3.59	1	74.636	71.179	.000	.114
		Marketing	2.89					
	Industry	ICT	3.30	1	10.708	10.212	.001	.018
		Automobile	3.11					
	F. X I.	ICT-R&D	3.64	1	3.442	3.283	.071	.006
		Auto-R&D	3.51					
		ICT-Marketing	3.03					
		Auto-Marketing	2.56					
Grievance / Complaint Resolution (4E-6)	Function	R&D	3.62	1	113.270	144.650	.000	.207
		Marketing	2.74					
	Industry	ICT	3.22	1	7.764	9.915	.001	.018
		Automobile	3.09					
	F. X I.	ICT-R&D	3.65	1	3.394	4.334	.038	.008
		Auto-R&D	3.56					
		ICT-Marketing	2.86					
		Auto-Marketing	2.44					

R Squared Values of Type III Sum of Squares in the Corrected Model		
.171 (Adjusted .167)	.227 (Adjusted .223)	.150 (Adjusted .146)
.122 (Adjusted .117)	.214 (Adjusted .210)	
Described in the order of dependent variables mentioned above.		

Table 6.11. Multivariate Effects (at $p < 0.05$ level) – HRM

However, Table 6.12 reveals that team size does not influence the difference between ICT and automobile effects. Lower values in the cells of Table 6.12 indicate multivariate effects when team size alone is controlled. Even if the effect of team size on dependent variables is controlled in MANCOVA, the statistical significance of effects of ICT and automobile sectors on the variables is not changed. This fact means that the other factor in the ICT industry makes ICT effects greater. Through the re-analyses of interview and survey answers, a reason[41] is identified.

[41] The other possibility is statistical insufficiency that results from an issue of sample size and outliers. However, statistics from the same data show most results well-constructed and connected consistently.

		N
Function	R&D	278
	Marketing	280
Industry	ICT	368
	Automobile	190

DV	IV			*df*	Mean Square	*F*	Sig.	Effect Size
	Variables	Alternatives	Mean					
Merit-Based Promotion (4A-3)	Covariates	Team Size		1	.434 .438	.518 .511	.472 .475	.001 .001
		Home		1	11.558	13.783	.000	.024
	Function	R&D	3.70	1	95.547 91.331	113.942 106.454	.000 .000	.171 .161
		Marketing	2.90					
	Industry	ICT	3.33	1	1.641 4.569	1.957 5.325	.162 .021	.004 .010
		Automobile	3.24					
	F. X I.	ICT-R&D	3.71	1	5.445 4.169	6.493 4.860	.011 .028	.012 .009
		Auto-R&D	3.68					
		ICT-Marketing	3.01					
		Auto-Marketing	2.63					
Performance Appraisal (4B-2)	Covariates	Team Size		1	.127 .128	.138 .139	.710 .710	.000 .000
		Home		1	2.423	2.629	.105	.005
	Function	R&D	2.90	1	114.317 117.298	124.036 126.898	.000 .000	.183 .187
		Marketing	3.93					
	Industry	ICT	3.50	1	.748 1.600	.811 1.731	.368 .189	.001 .003
		Automobile	3.25					
	F. X I.	ICT-R&D	2.96	1	.033 .103	.036 .111	.849 .739	.000 .000
		Auto-R&D	2.80					
		ICT-Marketing	3.95					
		Auto-Marketing	3.86					
Performance-Based Pay (4C-1)	Covariates	Team Size		1	.113 .116	.108 .107	.743 .743	.000 .000
		Home		1	14.919	14.187	.000	.025
	Function	R&D	3.04	1	67.150 72.106	63.855 66.971	.000 .000	.104 .108
		Marketing	3.89					
	Industry	ICT	3.58	1	2.004 5.700	1.906 5.294	.168 .022	.003 .009
		Automobile	3.25					
	F. X I.	ICT-R&D	3.12	1	.596 .188	.567 .175	.452 .676	.001 .000
		Auto-R&D	2.93					
		ICT-Marketing	3.96					
		Auto-Marketing	3.70					
Various Benefits (4C-4)	Covariates	Team Size		1	.598 .592	.583 .565	.446 .453	.001 .001
		Home		1	14.060	13.706	.000	.024
	Function	R&D	3.59	1	69.294 65.246	67.550 62.175	.000 .000	.109 .101
		Marketing	2.89					
	Industry	ICT	3.30	1	5.700 11.289	5.556 10.758	.019 .001	.010 .019
		Automobile	3.11					
	F. X I.	ICT-R&D	3.64	1	4.033 2.837	3.931 2.704	.048 .101	.007 .005
		Auto-R&D	3.51					
		ICT-Marketing	3.03					
		Auto-Marketing	2.56					
Grievance / Complaint Resolution (4E-6)	Covariates	Team Size		1	.118 .117	.152 .149	.697 .700	.000 .000
		Home		1	5.572	7.185	.008	.013
	Function	R&D	3.62	1	105.338 102.432	135.816 130.609	.000 .000	.197 .191
		Marketing	2.74					
	Industry	ICT	3.22	1	4.699 7.834	6.058 9.989	.014 .002	.011 .018
		Automobile	3.09					
	F. X I.	ICT-R&D	3.65	1	3.805 3.061	4.905 3.902	.027 .049	.009 .007
		Auto-R&D	3.56					
		ICT-Marketing	2.86					
		Auto-Marketing	2.44					

R Squared Values of Type III Sum of Squares in the Corrected Model		
.192 (Adjusted .185)	.231 (Adjusted .224)	.172 (Adjusted .164)
.172 (Adjusted .166)	.227 (Adjusted .221)	.150 (Adjusted .144)
.144 (Adjusted .136)	.225 (Adjusted .218)	

.122 (Adjusted .116)	.215 (Adjusted .209)	

Described in the order of dependent variables mentioned above.

Table 6.12. HRM – Control of Team Size and Home Countries (at $p < 0.05$ level)

A time period taken for a project is an influential factor that can increase the ICT effects on HRM practices. When project performance period is controlled as a covariate, a little change in the result is found. This fact means that above ICT effects can result from development time taken to complete a final knowledge outcome.

When interviewees were asked about performance appraisal systems, an R&D employee said:

> It is very hard to measure performance (MNC 2C-1).

When the reason was asked in a following question, the interviewee explained:

> Our project outcomes are applied into a specific firm product 6 months later, 1 year later, or even after that. This means market response will be seen much later than the product development and thus it is difficult to have fair performance criteria (MNC 2C-1).

This was confirmed by other R&D employees. For example, another interviewee said:

> Yes, how can we measure performance exactly? We have to wait too long to see whether our technologies are successful or not (MNC 1C-2).

For example, the period that a specific new project is performed for is relatively short in the development of a mobile phone, whereas the period becomes longer in the development of a new car. New technology such as a specific engine and a special design in the car industry is developed over a three-year period. Capturing the performance of employees within a year as the outcomes of HRM practices can be difficult for it takes more than three years for the firm to recognize the success of the product.[42] In contrast, employees' reactions to HRM practices are more easily found out in the ICT industry. The HR function can collect the effects of HRM practices on employees more quickly and thus has more opportunities to improve the quality of HRM practices.

Upper values in the cells of Table 6.12 reveal multivariate effects when both team size and home are controlled. As seen in the table, the difference of home countries does not affect the effects of functions on dependent variables. It means that the statistical significance of the effects is not changed at all. For this reason, multivariate effects in the

[42] Some specific practices such as team-based appraisal and performance-based pay can better reflect the ICT effects.

table are significant regardless of home countries. The effects of R&D and marketing on HRM features are significant beyond home country effects. This research mainly looks at functional effects on dependent variables, controlling home countries and team size. Thus, the direct effects home countries on HRM features are not tested in this MANCOVA. Home country effects on dependent variables are briefly introduced in the discussion section. The home country effects on HRM features are investigated then.

6.4 Discussion

The design of individual and group work affects outcomes through responses to task interdependence (Wageman, 1995). A concern is how individual and group work can be designed effectively. The answer can be gained from the understanding of newly-developed knowledge nature with individual and group responsibilities. When an MNC subsidiary develops ICT marketing outcomes, the whole work process becomes sequential rather than reciprocal. Individuals perform more independent tasks and their outcomes are transferred to the next units for their following tasks. Marketing units in the electronics industry reveal such work structures and their employees have more independent tasks. MNCs are thus likely to stress individual responsibilities rather than group responsibilities to motivate employees. This is because it becomes easy to measure individual outcomes in rational appraisal criteria. For example, one of the electronics MNCs designs an event in F1

Grand Prix sponsorship and its marketers need to expose its LED technology and brand name in the game. Working roles are clearly assigned to three to five team members for public relations, marketing materials, and event organising. At the subsidiary level, ICT marketing knowledge processes are more dependent upon the regional HQ. This is because ICT products are sold across adjacent countries and thus some of the marketing knowledge can be used together.

Developing automobile marketing outcomes similarly has sequential work processes and individual responsibilities still become critical. Marketing units in the automobile industry frequently design projects in a slightly larger TFT so that employees with different roles can work together. Each of the TFT members has an original work boundary such as product road mapping, branding, market research, in-store management, public relations, online marketing, marketing materials, and event organising. They can simultaneously have a role assigned from the temporary group. At this time, a bigger team size and a longer development period can result in the partial use of group responsibilities. Responsibilities for lowly-complex knowledge, however, have a tendency toward the individual level. At the subsidiary level, automobile marketing knowledge processes are less dependent upon the regional HQ, unlike the ICT marketing case.

When an MNC subsidiary develops ICT R&D outcomes, its work structures become reciprocal across teams rather than sequential. Individuals cooperate with someone in other teams so that they can

assembly two different pieces of knowledge. R&D units in the electronics industry reveal such work structures and the employees become very dependent upon their preceding task and following task. Technicians in R&D processes for mobile phones work in frequent interactions with the technicians for adjacent components. Several data are shared and changed during their collaboration so that different technologies can function together in a product. MNCs thus have trouble with outlining individual responsibilities because of the interactive outcomes. Group responsibilities are assigned to the R&D technicians for this reason but there is a particular work structure. Group responsibilities may make individuals discouraged and thus MNCs design an internal competition structure. For example, MNCs assign the same project for new HDD technologies to multiple R&D centres and then they make efforts for the new knowledge to be selected by the headquarters. The best technologies will be applied to a new product among multiple R&D outcomes in this structure.

R&D technicians in the car industry similarly work cooperatively in reciprocal interdependence. Indistinct outcomes by several task interactions make group responsibilities valued. However, the R&D expenses are much higher than those of HDD R&D because of the large scale components. The headquarters cannot assign the same project to multiple R&D centres in order to motivate people at this time. Instead, the MNC sets a goal in comparing with the technological performance of rival companies. The R&D technicians have group responsibilities but perform

their best to compete with R&D technicians in other companies. Responsibilities for highly-complex and complex knowledge thus have a tendency toward the group level accompanied by a practical internal competition or a virtual external competition. At this time, a bigger team size and a longer development period in the automobile industry make knowledge more complex and thus the needs of group responsibilities are strengthened with a more reciprocal interdependent tendency. The MNC HR function can thus consider the following facts in internal HRM settings.

	R&D	Marketing
ICT	*Interdependent Competition* (The same assignment is given to two subsidiaries.)	*Independent Cooperation* (More dependent upon the regional HQ)
Automobile	*Interdependent Cooperation* (An assignment is given to a single subsidiary.)	*Independent Cooperation* (Less dependent upon the regional HQ)

Table 6.13. The Relations between Foreign Subsidiaries and HRM

Finally, home country effects on HRM features are discussed further. As seen in Table 6.14, Western companies are greater than Eastern companies in home country effects on merit-based promotion, performance-based pay, various benefits, and grievance and complaint resolution. In other words, employees in Western MNCs feel more strongly that HRM practices are helpful for projects, compared with employees in Eastern companies. This research cannot explore this matter more deeply because home country effects are not core in this and

thus are controlled as a covariate. Nevertheless, Western companies are apt to have better supporting systems for cross-national projects.

		N
Home	Western	209
	Eastern	349
Function	R&D	278
	Marketing	280

DV	IV			*D f*	Mean Square	*F*	Sig.	Effect Size
	Variables	Alternatives	Mean					
Merit-Based Promotion (4A-3)	Covariate	Team Size		1	.591	.716	.398	.001
	Home	Western	3.46	1	11.719	14.206	.000	.025
		Eastern	3.20					
	Function	R&D	3.70	1	70.907	85.960	.000	.135
		Marketing	2.90					
	H. X F.	Western-R&D	3.69	1	13.720	16.633	.000	.029
		Eastern-R&D	3.71					
		Western-Mktg.	3.27					
		Eastern-Mktg.	2.64					
Performance Appraisal (4B-2)	Covariate	Team Size		1	.287	.311	.577	.001
	Home	Western	3.56	1	3.467	3.766	.053	.007
		Eastern	3.32					
	Function	R&D	2.90	1	121.436	131.883	.000	.193
		Marketing	3.93					
	H. X F.	Western-R&D	3.04	1	.339	.368	.545	.001
		Eastern-R&D	2.82					
		Western-Mktg.	3.99					
		Eastern-Mktg.	3.88					
Performance-Based Pay (4C-1)	Covariate	Team Size		1	.260	.246	.620	.000
	Home	Western	3.74	1	18.004	17.079	.000	.030
		Eastern	3.30					
	Function	R&D	3.04	1	81.047	76.882	.000	.122
		Marketing	3.89					
	H. X F.	Western-R&D	3.28	1	.096	.091	.763	.000
		Eastern-R&D	2.92					
		Western-Mktg.	4.12					
		Eastern-Mktg.	3.72					
Various Benefits (4C-4)	Covariate	Team Size		1	.284	.275	.600	.000
	Home	Western	3.44	1	17.246	16.711	.000	.029
		Eastern	3.12					
	Function	R&D	3.59	1	53.351	51.697	.000	.085
		Marketing	2.89					
	H. X F.	Western-R&D	3.69	1	5.154	4.994	.026	.009
		Eastern-R&D	3.53					
		Western-Mktg.	3.23					
		Eastern-Mktg.	2.66					
Grievance / Complaint Resolution (4E-6)	Covariate	Team Size		1	.012	.016	.901	.000
	Home	Western	3.28	1	7.094	9.110	.003	.016
		Eastern	3.11					
	Function	R&D	3.62	1	87.000	111.731	.000	.168
		Marketing	2.74					
	H. X F.	Western-R&D	3.63	1	5.912	7.593	.006	.014
		Eastern-R&D	3.61					
		Western-Mktg.	3.00					
		Eastern-Mktg.	2.55					

R Squared Values of Type III Sum of Squares in the Corrected Model		
.204 (Adjusted .198)	.230 (Adjusted .224)	.168 (Adjusted .162)
.137 (Adjusted .131)	.220 (Adjusted .214)	
Described in the order of dependent variables mentioned above.		

Table 6.14. Effects of Home Countries (at $p < 0.05$ level) – HRM

CHAPTER 7: DISCUSSION

7.1 Introduction

The purpose of this chapter is to put empirical findings into contexts and address theoretical contributions in discussing causal factors that have not been treated in previous chapters. The previous three chapters explored MNC knowledge processes in the angle of local team relationships, transnational work structures, and the configurational fit of HRM. This chapter starts with a brief overview of the significant findings of those three chapters. Secondly, what kinds of causal factors affect knowledge processes across functions and sectors are reasoned out. Then organisational implications in findings are discussed in two different perspectives. Most importantly, this chapter turns to empirical and theoretical contributions, and some specific theories are delivered to discuss what my research has studied in relation to the theories. They are explained in three areas linked with previously-identified research gaps. Finally, some suggestions for HR practitioners are added through Section 7.6 and subsequent concluding comments. They can contribute to designing supportive systems based on the differences of R&D and marketing subsidiaries.

7.2 Summary of Empirical Findings

Previous empirical chapters present empirical findings in classifying them into three areas: knowledge creation, transfer, and HRM in MNCs. The local team relationships of MNC subsidiaries are reviewed as a key of knowledge creation in the process through which knowledge created in foreign subsidiaries is transferred to the parent company. The second knowledge transfer is clarified through the transnational control structures of MNCs. Identified knowledge creation and transfer contexts then provide some choices for the best fit of MNC HRM. More importantly, these relationships and HRM settings are analysed in the comparative frame of MNC marketing and R&D subsidiaries. The contextual factors of these different learning sites present reasons for an argument of the HRM best fit. Response factors linked to the three main topics mentioned above are discovered in forming dependent variables explained by the functional variation of marketing and R&D. The distinctive effects of ICT and automobile industries on the factors are unveiled as well. Therefore, how the contexts of R&D and marketing subsidiaries and ICT and automobile industries configure the key factors of MNC knowledge transfer is revealed in my research.

There are some important points in each empirical chapter. Local team relationships in MNC foreign subsidiaries were previously explored in Chapter 4. Knowledge complexity and task interdependence are critical factors associated with the local team relationships of MNC foreign subsidiaries. Firstly, knowledge complexity is increased by R&D

team relationships rather than marketing team relationships due to lab-based face-to-face work widely-used in R&D. On the contrary, paperwork and web-based communications widely-used in marketing projects produce codified explicit knowledge on the contrary. Secondly, R&D subsidiary teams have higher interdependence than marketing subsidiary teams. Sequential interdependence primarily occurs between marketing project teams. The output of a team becomes the input of another for a taskforce project. On the other hand, reciprocal interdependence occurs more frequently between R&D project teams. R&D teams are responsible for different technologies, but these technologies must work together in a product. Thus, R&D team tasks are closely related to each other and reciprocally modified in order to make the new product work. In terms of inter-team socializing and intra-team socializing, ICT and automobile sectors vary. The role of team leaders as an arbitrator that resolves task-related disputes with other teams is emphasized when interdependence between teams becomes lower.

Chapter 5 focused more on investigation on transnational work structures between foreign subsidiaries and the HQ rather than local relations. Local embeddedness, information dependence on HQ, and subsidiary autonomy are matters relevant to cross-national control relations between them. Firstly, the local embeddedness of foreign subsidiaries reflects the relational structure between two multinational teams. This indicates that a subsidiary is centralized toward the HQ or decentralized from it. Marketing subsidiaries tend to be locally embedded

because the main data source of a project is the specific national markets. Therefore, subsidiaries are more decentralized from the parent company. On the other hand, R&D subsidiaries are less locally embedded because they are centralized toward the parent company to gain fundamental information from the HQ. R&D is more related to the development of new products across the MNC as a whole. Secondly, the knowledge sharing frequency with both HQ and other subsidiaries appears higher in R&D than in marketing. This is because HQ teams or other subsidiary teams are directly or indirectly involved in a MNC project. The different structural figures of marketing and R&D cause distinctive expatriation types for the effectiveness of knowledge transfer. Finally, the levels of decision autonomy over local strategies and resources planning are changed on the basis of information dependence on the parent company and external networks.

Chapter 6 explored the best fits of HRM linked to the issues of Chapter 4 and 5 in marketing and R&D contexts. It considered how HRM could be set for distinctive knowledge processes in MNC R&D and marketing. The best practices of HRM that can be linked to competitive advantage or high performance widely in organisations exist (Huselid, 1995; Pfeffer, 1995; 1994). However, they tend to be selectively employed in MNCs according to functional contexts. There were alternative choices of HRM settings: performance-based or performance-free incentives, individual or group-based HRM settings, and self-managed daily work or leader-managed daily work systems. With these functional effects, HRM

fits based on industrial distinctive factors were addressed as well. Firstly, performance-free and non-financial incentives are effective for the knowledge process of R&D, whereas performance-based incentives are effective for the knowledge process of marketing. Secondly, group-based HRM settings are preferred in R&D in order to effectively work together but individual-based HRM settings in assigning individual responsibilities are more important in the knowledge process of marketing. Thirdly, the self-managed daily work system is preferred in R&D, whereas the leader-managed daily work system is preferred in marketing. In this case, self-managed daily work is supported by maintenance leadership, which can be developed more easily through leadership training programmes. Leader-managed daily work is supported by task leadership, which causes more focus on employee skill training.

7.3 Causal Factors across Different Sectors

This section tries to solve how the cross-categories of functions and industries configure the factors. Their similarities and differences are discussed across previous empirical chapters. There are four dimensions when functional and industrial contexts are considered together. Empirical findings are configured in these distinctive environments and thus their comparisons allow the reinterpretation of findings. R&D, marketing, ICT, and automobile groups were employed as independent variables in the multivariate MANOVA. Different categories formed from them are ICT-R&D, ICT-marketing, automobile-R&D, and automobile-

marketing. A point to note is that my research does not put weight on inter-individual relationships but focuses on inter-team relationships both within a country and across countries. More importantly, this section discusses *team size*, *R&D costs*, *product standardization and size*, *the number of technologies* in a product, and *the number of projects* as causal factors that influence knowledge processes across functional and industrial contexts.

7.3.1 Number of Technologies, Team Size, and R&D Costs

Cross-Dimensional Factors of ICT-R&D and Automobile-R&D

The ICT-R&D dimension indicates MNC R&D subsidiaries in the ICT industry. The rate of face-to-face interactions between different teams is the highest in this categorical dimension. When this dimension is compared with automobile-R&D, the automobile-R&D group has a tendency that face-to-face interactions is very high within the same team but interactions between different teams are not greater than those in the ICT-R&D category. This is because employees tend to have more intra-team relationships rather than inter-team relationships when team size becomes bigger. In other words, the *team size* of ICT-R&D subsidiaries is relatively smaller than that of automobile-R&D subsidiaries. Teams in ICT-R&D subsidiaries become more interdependent on each other as a result and thus there are lab-based relationships that form a virtual TF team rather than team-based relationships. Subsidiary teams can understand what other teams do even without job rotation across teams.

High task interdependence based on more reciprocal co-work and knowledge complexity based on more socialization activities appear across teams in this situation. On the other hand, such high task interdependence and high knowledge complexity appear more clearly between members in a specific team rather than across teams in the case of automobile-R&D subsidiaries. Lab-based inter-team relationships represent the local work structure of ICT-R&D, whereas lab-based intra-team relationships reveal the local structure of automobile-R&D.

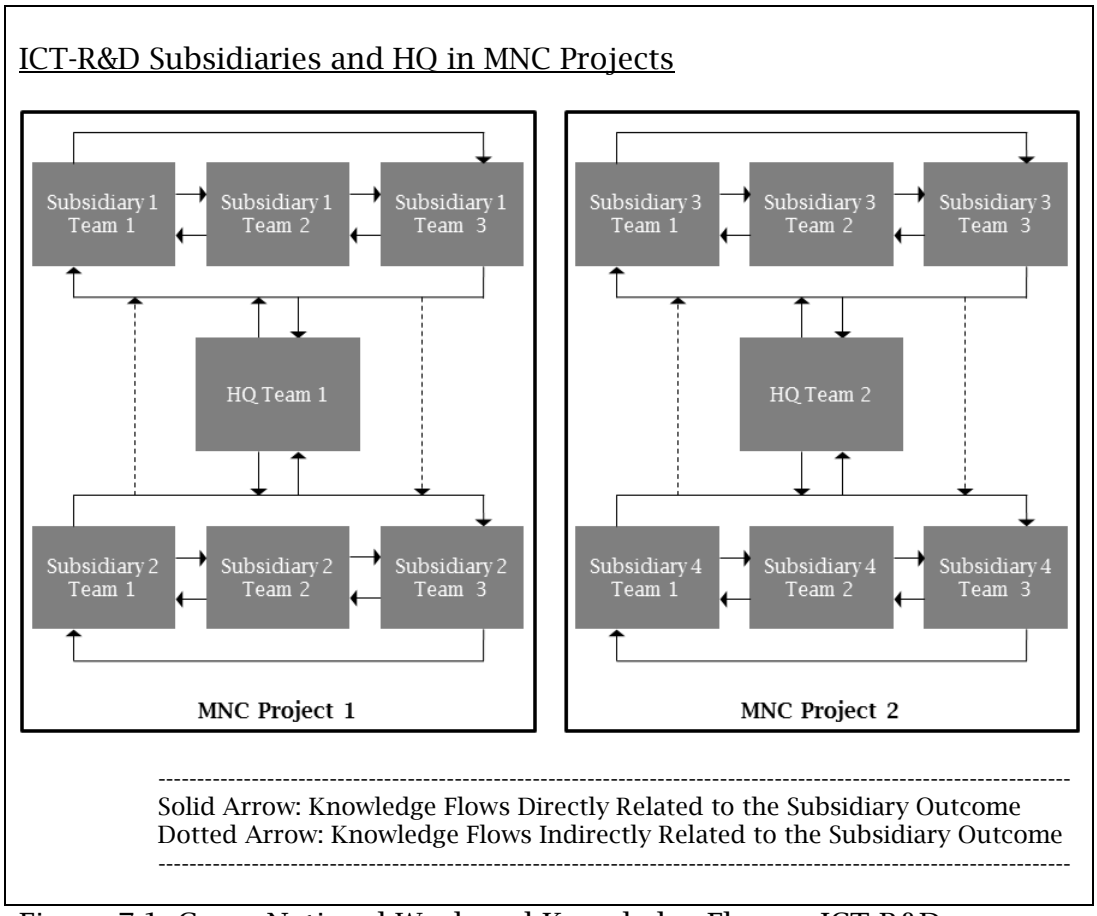


Figure 7.1. Cross-National Work and Knowledge Flows – ICT-R&D

The automobile-R&D dimension explains MNC R&D subsidiaries in the automobile industry. In each subsidiary, the work structure is similar to that of ICT-R&D. Face-to-face interactions between different teams are high in this category but lower than those of ICT-R&D. However, the automobile-R&D employees tend to have more face-to-face interactions in the same team rather than between teams. This fact results from bigger *team size*, compared to the team size of ICT-R&D subsidiaries. Bigger team size results in a higher independence rate of each team and thus a work structure between teams becomes less interdependent. As a result, the intra-team work structure of automobile-R&D teams is very reciprocal but their inter-team work structure is somewhat sequential in a foreign subsidiary.

Relationships between employees in automobile-R&D subsidiaries are also based on laboratory co-work, but this lab-based work structure more correspond to an intra-team-based work structure. This fact means that ICT-R&D teams work together across teams very often in forming a virtual team, whereas automobile-R&D employees mainly work in their routine team even though they also form a virtual team. Such a structural distinction results from a difference between the subsidiary assignments of ICT and automobile R&D. A project assignment given to ICT-R&D subsidiaries is normally to develop *all technologies* that compose a complete product. On the other hand, a project assignment given to automobile-R&D subsidiaries is normally to develop *partial technologies* that compose a few specific parts of a complete product.

When technologies developed by multiple automobile-R&D subsidiaries are put together, a complete product can be created. Because an R&D subsidiary in the automobile industry does not have to coordinate team outputs for a whole product, each team becomes more independent. Socialization activities across teams are less frequent in automobile-R&D subsidiaries but socialization activities within a team are more frequent. For this reason, knowledge complexity is similarly high even in automobile-R&D subsidiaries.

In the cross-national relation, two different subsidiaries are often involved in a project together as seen in Figure 7.1. They are interdependent to share information and they also compete with each other for a better outcome. The winning subsidiary is finally compensated by the parent company when the project is completed. ICT-R&D subsidiaries work very closely with the parent company and thus information is very frequently shared between them. Paired subsidiaries thus tend to competitively work together under the control of the parent company. The information dependency of these subsidiaries on the parent companies is high and thus they are centralized toward the parent companies.

Decision autonomy over local R&D strategies becomes necessarily low under the control from the HQ. At this time, key information is originated from the parent companies to support the subsidiary work. Decision autonomy over how to input local HR and financial resources to develop R&D knowledge according to strategies

from parent companies is higher than that of marketing as a trade-off between carrots and sticks to motivate R&D subsidiaries. This autonomy is linked to the behavioural standards and working conditions of R&D subsidiaries. R&D employees thus have relatively more freedom over where, when, and how to work if they follow the R&D directions from parent companies. They are relatively free to organise themselves as long as they produce within the overall template.

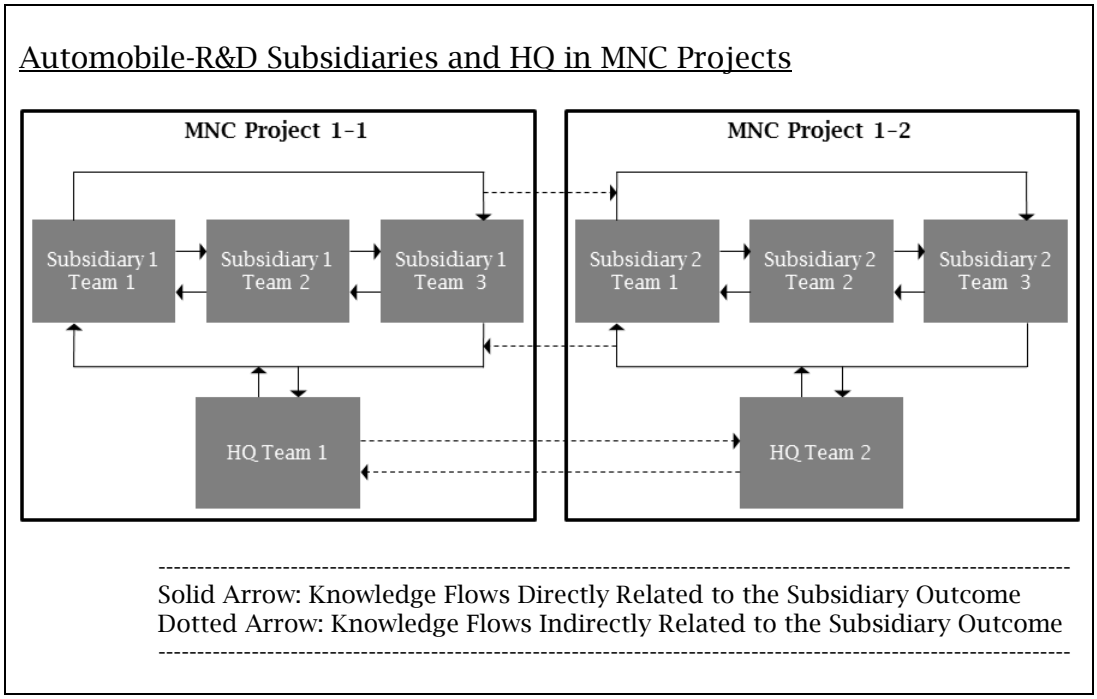


Figure 7.2. Cross-National Work and Knowledge Flows – Automobile-R&D

Similarly, automobile-R&D subsidiaries closely work with parent companies and thus information is frequently shared between them. The longer project period of automobile-R&D tends to decrease the frequency of cross-national information sharing for the same period of time. Project

1-1 and 1-2 depicted in Figure 7.3 mean that two projects in different subsidiaries are relevant. For example, when an automobile R&D subsidiary is responsible for a car engine, an automatic transmission system, and an electrical control system, another subsidiary can be responsible for a braking system, a suspension system, and a safety system. These car components are inter-relevant in a car and thus subsidiaries share necessary information with each other.

In this case, the role of the parent company as a coordinator for putting subsidiary outputs together is strengthened. The parent company coordinates their outputs by linking HQ teams to the subsidiary teams. This is because a few subsidiaries develop *different technological components* for a product in different places and thus someone needs to manage these relevant but separated outputs. The information dependency of these subsidiaries on the parent companies is high and the parent company keeps a tighter rein on subsidiaries in controlling them. In this situation, subsidiaries are more centralized toward the parent companies. Decision autonomy over local R&D strategies becomes lowest under the tight control by the HQ. This results from additional control caused by higher automobile *R&D costs*. Automobile R&D costs are higher than ICT *R&D cost* and thus cross-national co-work is more sophisticatedly designed and managed. Unnecessary experimental trials need to be minimized under the control in automobile-R&D.

7.3.2 Product Standardization, Product Size, and Number of Projects

Cross-Dimensional Factors of ICT-Marketing and Automobile-Marketing

Socialization activities and face-to-face meetings between different teams are not very frequent in ICT-marketing compared to ICT-R&D. ICT-marketing teams prefer sharing information with other teams through documentation to doing that through verbalization. For the daily routine work, ICT-marketing employees tend to work independently and brainstorming is frequent with the same team members. They talk directly with different team members for a specific issue and a TF team is sometimes formed on the basis of the importance of a project. For this reason, working together with different team members in the same space is not very frequent. The overlapped work across teams is a smaller percentage compared to ICT-R&D. This fact means that each task is less dependent on other tasks in lower task interdependence. ICT-marketing tasks actually take on the feature of a sequential work process. Information moves into the next team in turn and the team develops new knowledge on the basis of information created from a preceding task. In this work structure, frequent face-to-face meetings become ineffective and inefficient in terms of how long it took to complete a specific project. Formal and informal socialization activities across teams diminish in proportion to fewer interactions between tasks, and knowledge complexity decreases as a result.

Basically, automobile-marketing does not reveal a big difference from ICT-marketing. Socialization activities and face-to-face discussion

between different teams in a subsidiary are not very frequent similar to ICT-marketing. Sharing information with other teams through paperwork rather than verbal communication is general in the work structure of an automobile-marketing subsidiary. In addition, automobile-marketing employees independently work for their routine work and mainly talk with the same team members for an important matter. They do not talk with different team members very frequently and a TF team is formed when a specific project is very important and urgent. Tasks overlapped across teams are in a small percentage in revealing sequential task interdependence between subsidiary teams. Newly-developed knowledge moves into the next team in turn and the team develops different knowledge on the basis of the previous knowledge created in its preceding task. Written documents and electronic messages are main tools to share information with other teams and knowledge complexity becomes low in this situation.

Differences between ICT-marketing and ICT-R&D are a *project period* and the *number of projects performed in the same period of time*. From the empirical data of this research, a shorter project period tends to increase the frequency of inter-team information sharing for the same period of time. More projects performed for the same period of time are also apt to increase inter-team information sharing in order to speed up the work progress with supporting information from other teams. As a result, socializing and task interdependence between subsidiary teams become greater in ICT-marketing, comparing with automobile-marketing.

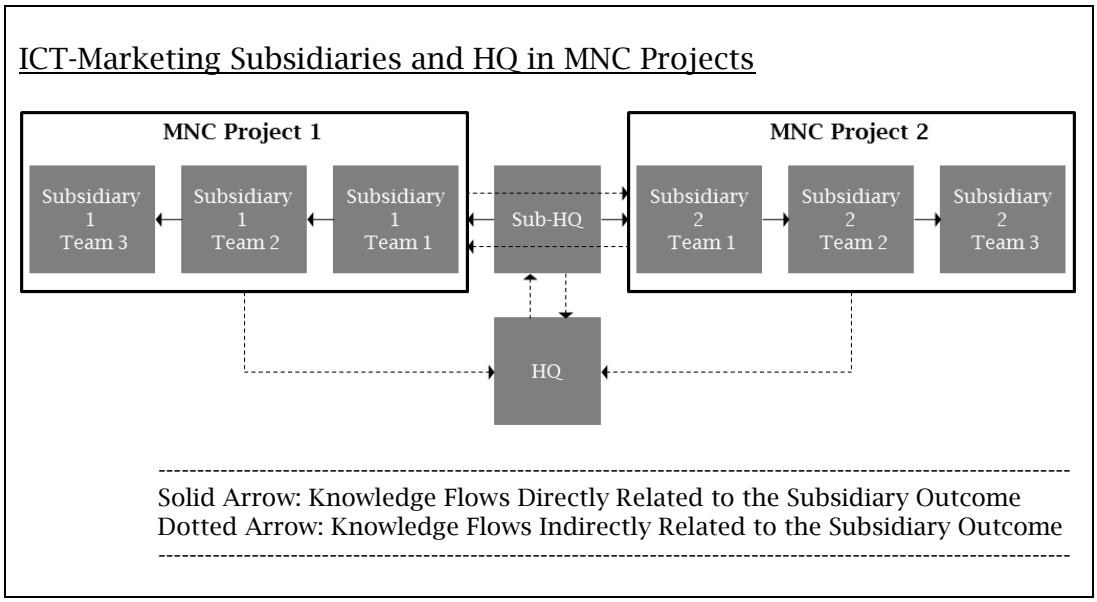


Figure 7.3. Cross-National Work and Knowledge Flows – ICT-Marketing

In the cross-national relation, ICT-marketing subsidiaries are not very dependent on the parent companies. More exactly, geographically-spread regional sub-HQs such as Western Europe-HQ, North America-HQ, and South-East HQ are more closely linked to the parent companies. Foreign subsidiaries that belong to each sub-HQ sequentially work with the sub-HQ as seen in Figure 7.2. As depicted in Figure 7.3, the relation between automobile-marketing subsidiaries and the regional HQ is not very different from that of ICT-marketing. Regional sub-HQs are linked to the parent company and subsidiaries interact with their regional HQ working together sequentially rather than reciprocally.

The difference of ICT-marketing from automobile-marketing is *market overlap* based on *product standardization* and *smaller product size*. ICT customers can purchase a smaller product from some other adjacent

markets more easily because the product can be delivered easily and used widely across nations. For example, a UK customer may want to buy a tablet PC from Germany because it is cost-efficient. Such market overlap becomes possible because the product is standardized to be used across nations and small enough to move to other nations. This situation makes a part of marketing knowledge useful across multiple countries. Information from a country thus moves to others via the regional HQ or the parent company sometimes. The dotted lines in Figure 7.2 indicate the move of information via the regional HQ or corporate HQ.

ICT-marketing subsidiaries independently work from the parent companies and key information is apt to be locally sourced. The information dependency of these subsidiaries on the parent companies is thus low and they are decentralized from the parent companies. Decision autonomy over local marketing strategies, which foreign subsidiaries have, becomes higher than that of R&D because key information is locally originated. Decision autonomy over how to input local HR and financial resources is lower than that of R&D under more control by the parent company.

In contrast, information from a subsidiary is less frequently shared with another subsidiary via the regional HQ in automobile-marketing. There is a reason why such a less tendency of information sharing appears in automobile-marketing. This phenomenon is caused by the *discreteness of cross-national markets*. Car products sold in a country cannot be moved easily to other countries because of *product size* and

legal issues. As a result, the overlap between customers in a country and in another is reduced. This non-overlap tends to cut down the portion of marketing cooperation between different regional subsidiaries. This fact means that information in a local area can be less useful in another area. Automobile-marketing subsidiaries are more decentralized from the parent company in this situation. Decision autonomy over local marketing strategies becomes higher than that of ICT-marketing.

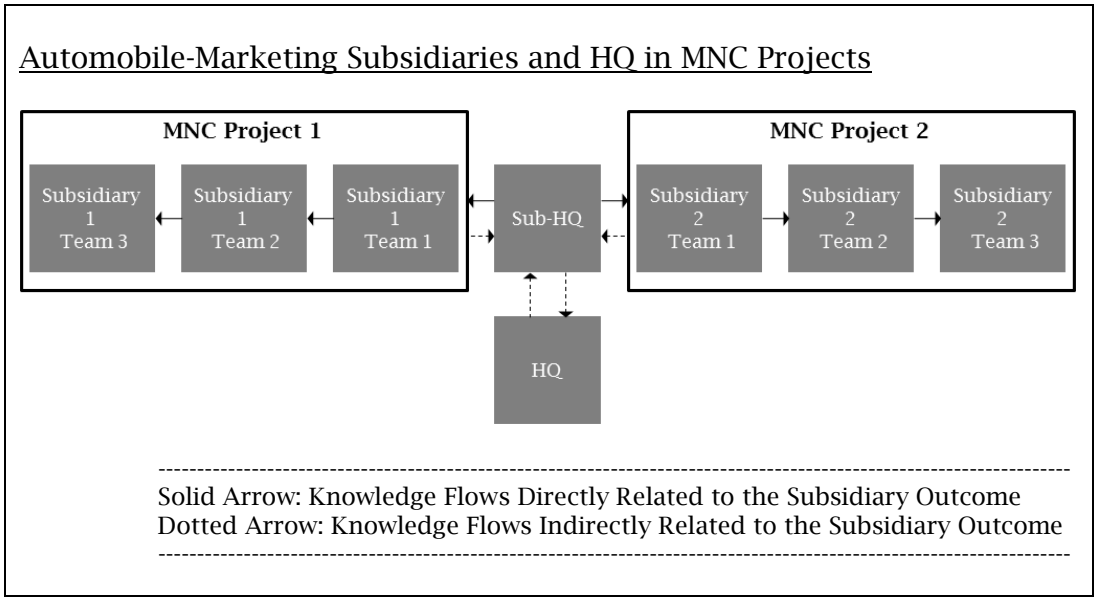


Figure 7.4. Cross-National Work and Knowledge Flows – Automobile-Marketing

Differences in above four categorical dimensions seem to reflect the effects of distinct variables: team size, R&D costs, product standardization and size, the number of technologies in a product, and the number of projects. These variables have effects in some contexts but not in others, and the reasons have been explained. There is one more

example, which is limited to a more specific context. *A test market* is sometimes operated for a newly-developed ICT product. This results in a difference between ICT-marketing and other categorical dimensions in increasing information sharing between subsidiaries across nations. For example, before a new portable electronic device is launched in the global market, it is introduced to selected customer testers and web bloggers in a specific local market. Their reactions to the new product are reflected in global marketing plans. Information created in the test market thus moves to other subsidiaries indirectly via the parent company. However, the effect of this variable does not appear in all cases of ICT-marketing. The variable does not operate in other three categorical dimensions either. For justification, critical realism can be taken in accepting limited recognition of causal relationships. Causes may or may not operate, and their effects depend on context.

7.4 Organisational Implications in the Knowledge Process

There are some organisational implications from comparisons across above categories of functions and sectors and they can clarify the knowledge transfer process of MNCs. Influential factors in knowledge creation and transfer have been discovered, and the most important factors can be *motivation* and *team structuring*. They have been uncovered in micro and macro-organisational perspectives.

7.4.1 Motivation

Micro-organisational perspectives more focus on individuals' behavioural change in dealing with learning, perception, personalities, attitude, and needs (Huselid and Becker, 2011; Rousseau, 2011). There is a more basic difference in how learning capabilities are provided and developed for a project between different learning sites. Firstly, R&D subsidiaries make efforts to recruit highly-educated and well-trained talent. Although new R&D employees are trained after entering an MNC, the training programme is mainly for how to work practically. Basic capabilities for a project come from what they have learned in school or other organisations. R&D employees are thus highly paid because of their professionalized skills. However, even highly-paid R&D employees tend to move more easily to other companies between 3 and 5 years after entering the company. They usually leave the company to find more interesting tasks, which are also helpful for their careers. They prefer having various portfolios to having more training in order to be professionalized for their career development. This phenomenon appears more seriously in R&D designers rather than R&D engineers. Although they cannot move into a rival company during a certain period after leaving a company due to legal reasons, they bravely leave the company because there are many companies that want them. The point is that financial rewards cannot motivate R&D employees in many cases. The cognitive evaluation theory reveals that financial rewards and promotion are not necessarily linked to employees' motivation and intrinsic motivation is required (Deci et al., 1989; Gagné and Deci, 2005). MNCs

must be more sensitive to the job satisfaction in presenting working conditions in which R&D employees can enjoy their tasks with prospects.

On the other hand, MNC marketing subsidiaries recruit highly-educated or well-trained talent for only managerial positions. Most new employees in marketing subsidiaries are continuously trained after entering the company. Marketing subsidiaries thus need to focus more on how to educate new employees effectively so that they can produce good performance. Marketing subsidiaries have to carefully check whether employees have necessary learning capabilities for a project. Without providing appropriate capabilities for marketing employees, MNCs cannot expect their outcomes and their job commitment becomes lower. Not only for team communications but also for team members' development, the role of marketing leaders is important. The skills and experiences of marketing leaders must effectively be passed down to the team members. The role of leaders as a task coordinator is also important when marketing employees work with other teams. The leaders have to resolve task-related disagreement that results from the relations between teams. Marketing employees are thus more dependent on team leaders in the work process. Therefore, the turnover rate of marketing employees can be reduced according to the ability of team leaders.

7.4.2 Team Structuring

Macro-organisational perspectives focus more on organisations themselves such as organisational objectives, structures, and

environments related organisational effectiveness. Macro-organisational and micro-organisational domains can be observed in a more integrated way by employing qualitative and quantitative data analyses (Huselid and Becker, 2011; Rousseau, 2011). Therefore, my research tried to consider how more macro team structuring affects more micro the motivation of employees. This is because my research is more interested in the bottom-up process of how knowledge gets created and transferred and how the process can be supported. When an MNC considers restructuring teams in a subsidiary, the way must not be uniform or one-sided. In a bottom-up way, how and what the subsidiary teams perform must be considered carefully for organisational team design. Some previous studies such as Claus (2003) and Pudelko and Harzing (2008) deal with the standardization and localization issues of managerial practices regardless of the work process. Directions in these cases cannot be more flexible according to what kinds of knowledge outputs MNCs assign to foreign subsidiaries. For example, the subsidiary control structure is one of the popular topics in macro-organisational perspectives. This topic is sometimes mentioned as coordination rather than control as in Van de Ven and Walker (1984). When key information has to be sourced locally in the work process for a project, the MNC HQ can grant decision autonomy over local strategies to the foreign subsidiary because the strategies need to be based on local specific information. This autonomy is linked to the employees' motivation at the micro-organisation level. If the parent company does not allow the decision autonomy in this case, subsidiary

employees are likely to be discouraged. The appropriate use of autonomy in organisational design can motivate subsidiary employees to produce better ideas.

The competition level in the same market, end-customers' needs, and external relationships affect the work process and thus organisational design must be changed on the basis of these factors as well. For example, when the knowledge outputs of subsidiary teams are very closely related and interdependent to each other, a team structure that supports the reciprocal work process is required. An HRM setting based on group responsibilities must be provided as well because individual performance is not clear in this case. If the work structure and HRM settings are designed to focus on individuals, many of employees are apt to feel that their appraisal and compensation system is not fair. In this situation, only one employee may be compensated for a few people's co-outcomes and uncompensated employees will be discouraged more easily. At this time, if the end customers want to have the new version of a specific product very shortly after the previous version is introduced, a project period becomes shorter in the subsidiary. According to the situation, the parent company will have to manage the subsidiary tightly in order to encourage local employees to create outcomes quickly. Team structures and HRM settings are necessarily changed to motivate employees more effectively.

7.5 Contributions

7.5.1 Contribution to Knowledge Complexity and Weak Ties

Empirical Contribution

This research previously addressed some research gaps in three main areas. The first one was insufficient understanding of tacit and explicit knowledge in the knowledge creation process. There was limited explanation of what the balance between tacit and explicit knowledge in the process is. In an empirical contribution, research findings present an answer to this issue in comparing R&D and marketing work structures. Different relationships based on functional contexts are thus revealed, whereby this research contributes to the configurational approach of organisational structures. My research argues that the nature of knowledge varies according to the organisation of work. Accordingly, it takes two functional activities, R&D and marketing, and identifies the distinct processes of knowledge creation in each.

Organisational knowledge is created through the conversion process of tacit and explicit knowledge (Nonaka, 1994; Nonaka and Takeuchi, 1995). Paperwork and web-based communications in marketing bring about more externalization, and lab-based face-to-face work in R&D causes more socialization. This fact reveals that effective organisational structures and managing ways are affected by contextual factors such as work environment as the configurational approach of organisations mentions. Environmental complexity, organisational strategy, technological contexts, and organisation size can be critical factors (Bums and Stalker, 1961; Chandler, 1962; Child, 1972; Hickson et al., 1969;

Lawrence and Lorsch, 1967; Thompson, 1967; Woodward, 1965). The different contexts of R&D and marketing are considered so that how organisational work structures are linked to them can be seen.

Many previous studies regard R&D knowledge as more explicit and codified information because they focus on technologies related to innovation (Roth, 2003). That is correct and it has never been questioned that R&D technologies are explicit in themselves. My research focuses on the knowledge creation and transfer process rather than the knowledge itself. However, the application of physical technology is linked to the socially complex conditions (Barney, 2007). When codified information is applied into a technical component in R&D, many ideas are shared through lab-based face-to-face discussions. At this time, all application ideas and skills gained after a lot of trials are not recorded. Only the output and necessary application manuals are recorded in the database. Some more tacit application ideas and know-how are shared only with a few members, who work together in the same lab. This non-codified information makes other employees unable to fully understand knowledge structures and thus knowledge complexity is caused. At this point, procedural ambiguity by frequent verbalization is a direct reason why the R&D application process results in knowledge complexity.

Documentation and unrecorded verbalization can be compared as the determinants of complexity caused in the knowledge process. The documentation of information means codified knowledge and thus cuts down knowledge complexity. In contrast, the verbalization of information

means that something is not only recorded but also is limitedly shared in an organisation, and thus knowledge complexity increases. In the global environment, world-renowned MNCs have systematic systems to codify cross-national project outcomes in both R&D and marketing. Even marketing produces a lot of written reports for most information under documentation policies and detailed guidelines. Marketing needs detailed documentation policies as a project management technique because they treat much *more projects* for a year. In addition, marketing employees spend less time working together than R&D employees, and thus information must be shared easily with other team members for relevant tasks. Of course, marketing still has a lot of tacit know-how but it is not frequently produced in a bigger marketing subsidiary. This tacit know-how is likely to be accumulated in sub-sales-organisations or smaller local companies rather than the marketing subsidiaries of big MNCs. A point is that bigger organisations involved in global projects have a formal documentation system to make knowledge explicit even in marketing.

Theoretical Contribution

More theoretically, weak ties theory in knowledge sharing of Hansen (1999) can be improved by findings here. He states that units in weak ties have search benefits, which are to help R&D project teams search useful information across units. Search benefits linked to less likely creating redundant knowledge can have a supplemental explanation with a formal documentation system and minimized procedural

ambiguity on the basis of non-verbalized communications as stated previously. These two factors structurally impede forming redundant knowledge and thus search benefits can increase in marketing rather than R&D. This empirical situation helps to understand what organisational structures facilitate search benefits.

In addition, how weak or strong ties are formed can be explained more clearly when R&D is compared with marketing. The distinction of tacit and explicit nature added into knowledge comes from socialization activities across teams or within a team. The figure of team relationships is linked to the work structures of R&D and marketing. R&D project teams in foreign subsidiaries have socialization activities more frequently than marketing project teams have. Marketing builds a taskforce team only in a special case and a person is allocated to the taskforce team from each daily-routine team. Taskforce members from different daily-routine teams work together according to the needs until the special project finishes. After that, these members return to their original teams and the taskforce team disappears.

On the other hand, virtual taskforce teams exist as much as the number of projects in R&D at all times. This fact means that R&D hardly structures a special taskforce team separately but R&D employees work daily as if they work in a taskforce team every day. R&D employees are not tied down by which team they belong to and more freely work with other team members for a project. People, who daily work together, become virtual team members tied by a specific project and help each

other in reciprocal task interdependence. R&D employees thus have more opportunities to meet and talk in the daily work structure. This situation results in stronger inter-team ties in R&D and weaker inter-team ties in marketing.

7.5.2 Contribution to MNC Control Structures in Knowledge Transfer

Empirical Contribution

The second gap was limited discussion of the role and autonomy of MNC subsidiaries. An important question was what types of autonomy are presented in foreign subsidiaries and what they do in the knowledge transfer process. This research shows that the processes of knowledge transfer and subsidiary autonomy vary on the basis of project characteristics. Empirical findings clarify these features of MNC subsidiaries, whereby this research contributes to the typological improvement of control perspectives in MNC knowledge transfer.

An empirical contribution to control perspectives in MNC knowledge transfer comes from clarifying subsidiary roles, autonomy, and expatriation in different types of subsidiaries. There is a knowledge flows-based framework that reveals the strategic types of foreign subsidiaries in MNC knowledge transfer (Gupta and Govindarajan, 2001; 2000; 1994; 1991). The four types based on knowledge inflows and outflows are a global innovator, an integrated player, a local innovator, and an implementer. They have been developed more or reclassified a little differently in previous studies such as Birkinshaw and Morrison

(1995), Enright and Subramanian (2007), Harzing and Noorderhaven (2006), and Nobel and Birkinshaw (1998), but they mainly focus on R&D units. My research findings can be applied into the typology so as to contribute to a typological improvement of the framework.

Firstly, ICT and automobile R&D subsidiaries tend to work as an integrated player as seen in Figure 7.5. They attain a lot of information from the parent company and also create a lot of knowledge for the parent company. On the other hand, ICT and automobile marketing subsidiaries are close to a local innovator because they tend to be decentralized from the parent company. However, information outflows become higher when an ICT marketing subsidiary is located in a test market for a new product. This ICT marketing subsidiary is apt to have more features of a global innovator in this case because it creates new marketing knowledge that can be used across several countries. Other ICT marketing subsidiaries that are not involved in the test market can behave as an implementer because they get additional information from the test market via their regional HQ or corporate HQ.

In this case, a low inflow of knowledge tends to be linked to decentralization and a high inflow of knowledge is apt to be related to centralization. More importantly, this situation is connected with the autonomy types of foreign subsidiaries. The levels of decision autonomy over local strategies and local HR/financial resources are changed on the basis of centralization or decentralization, and information dependence on the HQ or external organisations. When critical information is not

required from the HQ and thus a subsidiary is decentralized from it, the level of decision autonomy over local strategies becomes higher. In contrast, if a subsidiary needs to get much information from the HQ, the level of decision autonomy over local strategies becomes lower. The level of decision autonomy over local resources tends to be higher as a trade-off between HQ control and subsidiary autonomy at this time.

A point is that these facts can be generalized further when they work together for a specific cross-national project. My research focuses on the specific cross-national projects of MNC R&D and marketing. In this context, local innovators are likely to have more decision autonomy over local strategies, whereas it is possible for integrated players to have more decision autonomy over local resources. The following typology is thus improved in reflecting the distinction in the information sharing and types of autonomy of R&D and marketing.

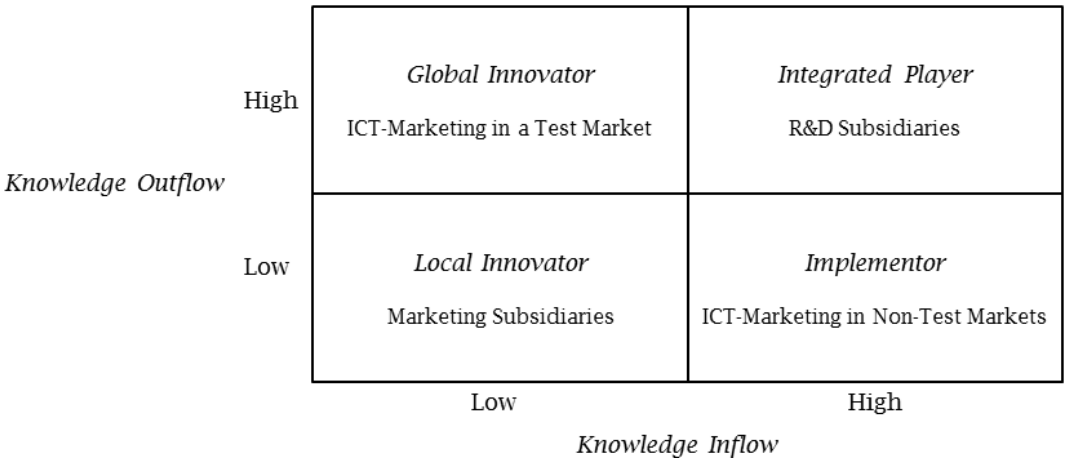


Figure 7.5. Subsidiary Roles in R&D and Marketing

Furthermore, the centralization and decentralization issue of MNC subsidiaries is connected with differences in expatriation for subsidiary control. R&D preferentially uses international working groups and international assignments rather than expatriates as a knowledge transfer method. Teams in R&D subsidiaries have close relationships with teams in the HQ to share necessary information. Sharing knowledge outcomes via expatriates is not effective because the loss of information is likely. R&D expatriates more focus on managing work conditions for team members rather than directly controlling the behaviour of team members related to tasks. R&D employees are relatively free to organise themselves but they should produce outcomes according to the R&D plans and descriptions given by the HQ.

7.5.3 Contribution to the Configurational Fit of MNC HRM

Empirical Contribution

The last gap was insufficient explanation of linking HRM to different types of foreign subsidiaries. My research wanted to explore how the best practices of HRM are used in R&D and marketing subsidiaries and what role HRM plays in these different learning sites. Empirical findings reveal the different focus and settings of HRM in R&D and marketing, whereby this research contributes to the best fit perspective of MNC HRM. It thus links debate on knowledge to debate on HRM and issues of 'best practice' or 'best fit'.

The best HRM practices linked to MNC performance have been identified in many studies (Wright et al., 2005a). However, these HRM practices can be more efficient when they are linked to their organisational environment (Stavrou et al., 2010). The main focus of the HRM best fit has been a linkage with organisational strategy based on competitive advantage (Fombrum et al., 1984; Schuler and Jackson, 1987; Wright and McMahan, 1992). HRM-performance links affected by geographical contexts have also been explored a few times (Stavrou et al., 2010). My research contributes to the best fit perspective of HRM in linking the particular sets of HRM practices to different contexts of R&D and marketing.

Firstly, non-financial benefits as well as financial compensation have a good influence on the effectiveness of knowledge processes in different contexts. R&D outcomes generally symbolize high performance and high value compared to marketing outcomes. Nevertheless, my research reveals that R&D employees are likely to be motivated by non-financial benefits rather than financial compensation. The descriptive statistics of research samples indicate the reasons why R&D employees prefer non-financial benefits. Most R&D employees are highly educated with a master's degree or a doctoral degree and have relatively more work experiences. This is because recruiting well-trained and specialized talent is preferred to training inexperienced employees after recruiting them. The turnover rate of employees within 5 years after joining the company is relatively higher in R&D than marketing. R&D thus invests money in

recruiting people who can work professionally as soon as possible rather than educating new employees.

As a result, R&D employees generally earn more money as a basic annual salary than marketing employees do. The law of diminishing return applied into pay was previously mentioned. This principle shows that the marginal increase in attractiveness becomes less than the marginal pay level (Worley et al., 1992). In other words, marginal utility that employees feel decreases when additional pay is inputted. If the marginal utility reaches a specific level, additional pay becomes ineffective. Then they want to work in better work conditions beyond earning much money as if rich people are more interested in well-being. Non-financial benefits are thus planned for R&D researchers more sophisticatedly. On the contrary, marketing employees will expect more financial compensation on the basis of their own performance because the basic annual salary of marketing employees is relatively lower than that of R&D employees. This fact does not mean that performance-based compensation is not provided in R&D. It is harder to evaluate individual performance in R&D because of the task interdependence mentioned above and *project time until market launching*. Compensation based on group performance is apt to be given to R&D employees for this reason.

At this time, R&D researchers tend to be motivated on the basis of interests or pleasure in organisational activities or relationships rather than financial rewards. In contrast, marketers display a strong tendency to be motivated by an external financial reward. These tendencies show

intrinsic motivation that comes from enjoyment in the task itself and extrinsic motivation that results from external regulations such as compensation rather than from inside an individual (Deci et al., 1989; Gagné and Deci, 2005; Gardner et al., 2004). Previous studies reveal that intrinsic motivation in adding autonomy, and the purpose is more important than extrinsic motivation because it focuses on learning itself so that side-effects can be minimized. Organisational control hidden in extrinsic motivation can disturb the commitment of employees (Kuvaas, 2006; Minbaeva, 2008). Cognitive evaluation theory specifically indicates that it is dangerous to try to motivate employees solely by external tools such as remuneration and promotion (Deci, 1975; Deci and Ryan, 1985). Managerial efforts to overcome this problem appear differently in R&D and marketing subsidiaries.

R&D subsidiaries try to reinforce intrinsic motivation through the combination of decision autonomy over working conditions and non-financial benefit. As mentioned above, the base salary of R&D employees is much higher than that of marketing employees. Additional financial compensation is not very effective in this situation because of the law of diminishing return. Instead, it is important to provide a favourable working environment for R&D employees so that they can pursue individual interest and demonstrate their ability. Marketing subsidiaries, on the other hand, pay more attention to financial rewards through the combination of decision autonomy over local strategy and financial compensation in marketing. Financial rewards based on individual

performance become more effective because the base salary level of marketing employees is relatively low. As a result, it is important to provide a fair performance appraisal and compensation system and a supportive training system for skills related to individual performance in marketing subsidiaries. More autonomy over working conditions such as time and space and work structures that help employees enjoy working with peers more are required in R&D subsidiaries. The best fits of MNC HRM can be clarified when these causal factors are considered on the basis of different contexts.

Knowledge Procedural Factors from Chapter 4 and 5		HRM Fits Configured
Task Interdependence (Inter-team and Intra-team)	↑	Group-Based Appraisal, Performance-Free Benefits, Self-Managed Daily Work
	↓	Individual-Based Appraisal, Performance-Based Incentives, Leader-Managed Daily Work
Information Sharing with the Parent Firm	↑	Lower Subsidiary Autonomy over Local Strategies, Centralization of Job Design
	↓	Higher Subsidiary Autonomy over Local Strategies, Localization of Job Design
Project Period	↑	Harder to Measure Performance, More Inflexible HRM Practices
	↓	Easier to Measure Performance, More Interactive/Flexible HRM Practices

Table 7.1. Linking Knowledge Procedural Factors to HRM

Table 7.1 specifically shows how knowledge procedural factors from Chapter 4 and 5 are linked to HRM in Chapter 6. When individual responsibilities are emphasized, we are likely to think that self-managed daily work will be preferred. However, MNC project outcomes are the

combined forms of individual outcomes. When individual responsibilities are emphasized, team leaders have an important responsibility for organising individual outcomes. On the other hand, when team responsibilities are emphasized, members that have different tasks frequently work together in the same place and thus can organise project outcomes by themselves. Problem-solving caused by integrating different tasks can be managed by members more easily in this case. Self-managed daily work, which means members' work style with less intervention of leaders, becomes possible in team-oriented co-work.

7.6 Messages for HRM Practitioners

To support R&D researchers and marketers, HR practitioners can consider putting weight on specific HRM practices. The results of this research have implications for certain aspects of HRM, namely pay, appraisals, and training.

7.6.1 Pay

R&D

When collective responsibilities are required to team members, focusing more on performance-free and non-financial benefits rather than performance-based incentives can be helpful for project team members. This is because collective responsibilities cause difficulty in measuring individual performance. R&D

employees are apt to feel that performance-based pay is not fair in this structure.

Marketing

Individual performance can be measured more clearly because marketers have lower task interdependence. In addition, marketing employees more easily feel that additional financial compensation is necessary because their base salary level is relatively low, compared with the level of R&D researchers. Performance-based incentives can be more effective for marketers.

7.6.2 Appraisal

R&D

The HRM systems of R&D need to support team work and allow the fact that some knowledge cannot be codified. Thus, appraisals should not be too mechanical. 360-degree or other means to get a sense of team commitment of someone might be useful here, perhaps also focusing on appraisal tools such as asking peers to describe a co-worker's good contribution, opposed to more rigid approaches using rating scales.

Marketing

More rigid approaches using rating scales based on a standardized format will be more effective to measure individual performance in marketing. A fair and clear appraisal system is likely to improve individual achievement of goals in marketing rather than in R&D.

7.6.3 Training

R&D

When employees perform self-managed daily work, maintenance leaders can support this work style more effectively. Maintenance leadership can be gained easily through leadership training in a short period of time. The work style is also linked to recruiting focus. When self-managed daily work is emphasized, recruiting focus should be on highly experienced low or middle level employees. This fact means that recruiting well-trained R&D employees can be more effective than training unskilled R&D employees.

Marketing

When leader-managed daily work is performed, task leaders can support this work style more effectively. Task leaders normally manage their group members on the basis of their previous experience and skills. Thus, most task leaders tend to be trained and skillful through their previous work experience. However,

many lower-level employees are less skilled and guided by their leader in this situation. Providing more training programmes for these lower-level employees can be more effective at this time. Regarding recruiting focus in this work structure, task leadership cannot be gained in a short period of time. Thus, HRM has to focus more on recruiting experienced and skilled talent at the managerial level.

7.7 Concluding Comments

My research views the best HRM fits and the best HRM practices as complementary approaches as in Stavrou et al. (2010). The best HRM fit approach has been less employed in empirical studies because a great deal of contexts surround MNC organisations. However, R&D and marketing contexts must not be overlooked because these two types of subsidiaries are crucial for MNC creativity. There are some suggestions for the more effective knowledge creation and transfer of MNCs. MNCs need to provide supportive systems, working structures, and conditions for employees in order to motivate them in the knowledge process. HRM can consider some of the following factors in distinguishing the R&D work process from the marketing work process: fair appraisal and compensation systems, supportive training programmes, right recruiting and staffing, sophisticated goal settings, and shared sense of belonging.

Firstly, if HRM excessively emphasizes individual performance in R&D subsidiaries, grievance caused by unfair appraisal that a person is

compensated for the other person's performance is apt to arise. HRM needs to provide non-financial benefit and supportive working conditions at this time so that intrinsic motivation can arise in a pleasant work environment. An appraisal and financial reward system must be linked to group performance rather than individual performance. On the other hand, fair evaluation criteria and financial rewards linked to individual performance are very important in marketing subsidiaries.

In addition, customized training programmes for learning capabilities are required in marketing subsidiaries. Skill training programmes that can directly increase individual performance should also be planned in marketing subsidiaries. R&D subsidiaries need short-term training programmes for team leaders to help R&D researchers work effectively. Recruiting the right people can be more important than training them in R&D subsidiaries. This is because R&D subsidiaries need to invest much more money for talented and well trained people when recruiting them. For this reason, appraisal criteria for recruiting need to be designed carefully. Selected people must be allocated into a position most relevant to their own professionalized skills.

Subsidiary employees are likely to be discouraged for several reasons. Goal setting is more important in R&D subsidiaries because group responsibilities can bring about free-riders' behaviour (Cox et al., 1991). Careful goal setting and sophisticated job design can result in better R&D performance. A sense of belonging is lower in R&D subsidiaries and thus the loyalty of R&D employees to the company is not

very high. The turnover rate within 5 years after entering the company is higher in R&D subsidiaries for this reason. The employees' sense of belonging can be increased by granting an opportunity to work in the parent company and showing sound recognition of their competence and ability by the parent company.

CHAPTER 8: CONCLUSION

8.1 Introduction

Organisational implications and empirical and theoretical contributions from research findings have been explained in the discussion chapter. This conclusion chapter focuses on recommendations for future research in MNC knowledge transfer and HRM. The first section briefly overviews the whole research with initial research questions. How initial research objectives are achieved through those findings is discussed and answers to research questions are described. After that, a few more organisational implications linked to business environments are added to supplement the discussion chapter. Then the subsequent section provides further reflection on the contribution of this research to Lam (2003). This chapter also assesses the strengths and limitations of research design and methods that may affect the interpretation of research results. Taking these points identified previously into account, this chapter proposes some directions and recommendations for future research. Finally, reflection on my research process and philosophical background is added including some academic and practical points.

8.2 Research Overview

Lam (2000, 2003) provided inspiration for this PhD research and there were some critical points to initiate new research. Lam (2003) investigates knowledge transfer from foreign R&D networks as the learning activities of MNCs in the pharmaceutical and ICT industry. This study pays attention to previous studies neglectful of strategies for establishing collaborative relationships with external research institutions and managing local labour markets. It thus focuses on relations with local academic institutions in host countries and influential conditions between home and host countries because it focuses on how knowledge is effectively shared. As a result, Lam (2003) explores HRM strategies to manage local universities and transnational learning in the US and Japanese MNCs. The findings show an example of HRM configurational fit: the locally-embedded US model in greater local autonomy and the home-oriented Japanese model in greater local control. However, research gaps are identified from her study and relevant studies such as Hansen (1999) and Gupta and Govindarajan (1991). The main gap is in developing a reasonably comparative frame across learning sites and reflecting their different contexts in the HRM strategy to manage foreign subsidiaries.

8.2.1 Research Objectives

What empirical findings ultimately indicate and thus what consistent patterns derive from them are the main questions. To answer the question clearly, it is important to discuss how these findings respond to initial research objectives. Firstly, my research had three sets

of research objectives to explore the knowledge transfer and HRM of MNCs. Previous studies have weaknesses in insufficient understanding of tacit and explicit relationships in the knowledge creation process, in the insufficient discussion of what roles and discretion MNC subsidiaries take, and in the limited explanation of how HRM supports knowledge processes across learning sites. The important thing is that they are caused by the focus on R&D and many things related to knowledge nature and work structures are missed by looking only at R&D. In reviewing these issues, my research addressed three groups of unsolved questions.

The first one was what would the balance between tacit and explicit knowledge nature be, and how local relationships would be shaped in the knowledge creation process. My research wanted to focus more on the local creation process connected to knowledge transfer, and investigate the distinctive conditions to produce tacit and explicit knowledge nature. The second one was what conditions would configure transnational relationships in the knowledge transfer process and what would be the effect of different learning sites. A focus was on comparing sites, other than R&D, in transnational learning cases and reviewing the control structure of MNCs. The last one was how local and transnational relational matters would be reflected in HRM settings of MNCs and how HRM could promote the knowledge process in different learning sites. The main focus was on how HRM activities would be patterned according to knowledge nature and work structures, and how R&D and marketing would affect the patterning process. Conditions that shape individual and

group work structures are carefully reviewed at this point. Brief answers to these initial questions are provided to remind important points as follows.

8.2.2 Balance between Tacit and Explicit Knowledge Nature

To answer the first question, the knowledge creation process must be reviewed carefully with knowledge transfer. The nature of knowledge complexity and task interdependence between local teams are closely related with the configuration of the knowledge creation process. For example, when a project outcome is very complex, face-to-face work styles are preferred in the knowledge creation process. Also, communications via team leaders increase when task interdependence between internal teams is lower in the creation process as well. There are some causal factors that form the knowledge creation process and affect the tacit and explicit relationships.

Firstly, frequent socialization activities produce tacit knowledge nature in a project outcome which leads to an increase in face-to-face meetings. The knowledge creation process may be longer and knowledge becomes more complex through much more idea sharing, brainstorming, and experimental trials in this case. Secondly, *communications using IT tools* such as web-based social network systems and intranets produce explicit knowledge nature in a project outcome which leads to a decrease in face-to-face meetings. The knowledge creation process and knowledge nature are likely to be simpler at this time. In addition, knowledge

presentation methods such as verbalization and documentation affect the knowledge creation process and nature. When documentation is systematically used in most cases, the knowledge creation process becomes faster by easily sharing ideas and findings with other team members. The tacit nature of knowledge decreases through *written reports* in this case as well. However, when knowledge sharing through unrecorded verbalization is frequent, tacit nature is added in a knowledge outcome in a relatively long process. The last one is *strong links between knowledge components* that constitute a project outcome. The links between them increase the dependence of a component on the other. This fact means that knowledge complexity becomes higher because of the dependence (Hansen, 1999; Teece, 1986; Winter, 1987; Zander and Kogut, 1995).

A point is that such a strong link between knowledge components tends to cause strong relationships between teams that produce each knowledge component. These teams need to work together frequently for different knowledge components to be consonant in a project outcome. The strong links between knowledge components thus result in both knowledge complexity and high task interdependence. There is a derivative produced from lower task interdependence caused by a weak link between knowledge components. Team leaders carry a role to resolve a task-related disagreement between teams. When task interdependence is low, the knowledge creation process becomes *simple and speedy*. However, a disagreement between teams sometimes occurs

and this problem is not resolved promptly without compulsory arbitration because they lack face-to-face communications. *Team leaders' abilities* can accelerate the knowledge creation process in this case. These casual factors and a derivative can be considered in balancing tacit and explicit knowledge nature for a more effective and appropriate knowledge creation process.

8.2.3 The Effect of Different Learning Sites

In responding to the second question, R&D and marketing reveal different cross-national work structures. The local embeddedness of foreign subsidiaries, dependence onto the HQ, and subsidiary autonomy over local strategies and resources shape the transnational work structures and thus affect knowledge transfer. These can be criteria to distinguish the R&D knowledge process from the marketing knowledge process. For example, information dependence onto the HQ is higher than in R&D. This high dependency results in more *direct knowledge transfer* between cross-national teams.

More importantly, there are more causal factors that form local embeddedness, information dependence, and subsidiary autonomy mentioned above. One is information dependence that means where core information for transnational projects comes from. When core information comes from the parent company and thus a subsidiary is dependent on the HQ information, centralization toward the parent company becomes accelerated. Closeness to the HQ increases at this time,

whereas the embeddedness of foreign subsidiaries in the local environment decreases. In contrast, when core information is locally sourced from external organisations, decentralization from the parent company becomes accelerated. Closeness to the HQ is relatively low at this time, whereas the embeddedness of foreign subsidiaries in the local environment increases. Another factor is knowledge sharing frequency with the HQ that means how often a subsidiary team communicates with an HQ team for a transnational project. Knowledge sharing activities sometimes become frequent for a specific purpose between subsidiaries and the HQ. For example, a parent company tries to closely act with a subsidiary to speed up a work process or to prevent an informational loss. Such specific objectives increase task interdependence between the subsidiary and the HQ through more frequent knowledge sharing activities. However, when a parent company does not show much concern on a *slow work process* and an *informational loss*, it does not plan to communicate with a subsidiary frequently. Task interdependence between them becomes lower through less frequent knowledge sharing activities in this situation. These two causal factors are likely to configure the knowledge transfer structure of R&D and marketing.

8.2.4 The Best Fits of HRM Practices and Work Structures

Regarding the last research question, causal factors that form knowledge creation and transfer structures mentioned above can determine distinctive HRM patterns. My research focuses on a bottom-up

way of HRM settings for patterning HRM activities on the basis of employees' perception. In this case, the HRM function of MNCs initially considers the project outcome and its expected work process, and then considers which pattern of HRM practices will support the knowledge process well.

The distinction between R&D and marketing comes from the factors that configure knowledge processes. Firstly, some factors make project outcomes more complex as previously-mentioned. When the project outcome is complex, the knowledge creation and transfer *process becomes longer* generally through more procedural steps that take frequent experimental trials. In this case, the time starting from product development to the launching stage also tends to be longer. This is because it takes more time to produce new knowledge on a commercial scale even after it is newly developed when new knowledge is very complex and consists of several components. It is likely to be difficult to measure performance related to the new knowledge. When an MNC has to give a performance appraisal, the new knowledge may not have been introduced in a market yet and thus the MNC cannot know whether it is successful or not. This situation tends to cause an HRM pattern based on non-performance-based practice settings. More non-financial benefits are required for the HRM setting at this time but this fact does not mean that a financial compensation level is low. It only means that financial compensation is not enough to motivate employees in this case because it is difficult to provide fair performance criteria.

Secondly, some other factors cause higher or lower task interdependence between teams. When task interdependence is high, individual responsibilities become unclear. HRM practices are patterned in group-based settings because individual performance is not easily measured at this time. Individual-based HRM settings become more effective when task interdependence is low and thus individual outcomes are more independent.

When HRM practices are patterned like above, each pattern is apt to have weak points. Forming a bundle with some other practices becomes important in this case. For example, group-based HRM settings result in discouraged individual performance in causing a free rider sometimes. Sophisticated job analysis accompanied with accurate job descriptions for each duty need to be provided for job commitment in this case. When performance-based HRM settings cannot be very effective, supportive work conditions, non-financial benefit, and some other exciting events that motivate employees become more important. These HRM patterns have to fit business strategy and environments related to project outcomes. In particular, R&D needs more adjustments in HRM settings according to the business strategy and environments. This is because it experiences more changes in work structures on the basis of what the market wants. If the market quickly responds to a new product, R&D project time should be shorter. As a result, the R&D knowledge process will be simpler to be faster. This situation may lead HRM settings

into more performance-based activities because of lower task interdependence.

On the basis of these findings, this research has empirical and theoretical contributions to knowledge complexity and weak ties, MNC control structures, and the configurational fit of MNC HRM as described in the discussion chapter.

8.3 Contribution to Lam (2003)

My research brings the configurational perspective of HRM to the MNC knowledge transfer literature. MNC knowledge transfer and HRM configurations have rarely been investigated together in previous studies. In this combined perspective, my research is particularly inspired by Lam (2003). Lam's study identifies two different HRM models in relation to the transnational learning of MNCs. These models are based on differences between the US and Japanese MNCs in managing local universities as scientific knowledge providers. In contrast, my research focuses more on the distinctive features of R&D and marketing, controlling home country effects.

The marketing function as well as the R&D function is highly dependent on knowledge transfer between subsidiaries and the parent company (Schlegelmilch and Chini, 2003). Nevertheless, these two functions have not been compared in Lam (2003) because it focuses on distinctive HRM model based on home country effects. There is a significant functional effect regardless home country effects. R&D and

marketing organise different features in terms of team socializing, task interdependence, work reporting types, external partner types, leadership styles, information dependence, knowledge sharing frequency, geographic proximity, knowledge transfer methods, and decision autonomy. In addition, their employees reveal different HRM perception when they are asked what of HRM practices supports their work.

The reason why I want to focus on functional differences is based on my previous work experience. When I worked in a multinational company's headquarters which had subsidiaries in Arizona, the US, and Beijing, China, I wondered why HRM practices were normally designed in the top-down way from the parent company to subsidiaries. My company used the same set of HRM practices for R&D researchers and marketing employees without considering their work differences, but the basic salary was normally higher for R&D researchers than marketers. My question was how employees from different functions could be motivated in the same way. When I encountered Lam's articles and others regarding the configurational fit, I thought this was what I had to research on. This was my starting point. And then, on the basis of academic conceptual framework, I was able to reach an answer. Functional effects are significant beyond the home effects by Lam (2003).

8.4 Strengths and Limitations

8.4.1 Strengths

One of the strong points in my research is that valuable empirical data and supplemental contents have been collected in mixing quantitative and qualitative approaches. The 26 R&D and marketing subsidiaries of 14 MNCs were chosen from the UK, the US, and South Korea for a questionnaire survey and 558 data sets are finally used for the analysis. The survey response rate was high enough as mentioned previously. In addition, 35 MNC employees from 4 R&D subsidiaries and 4 marketing subsidiaries located in the UK and the US were interviewed separately. Some undeserving data sets and outliers were carefully eliminated before data analysis was performed. Results were more clearly and deeply explained through these data sets.

	Japan	USA
ICT	1	1
Pharmaceutical	1	1
Case Comparisons in Lam (2003)		

→

	R&D	Marketing
ICT	2	2
Automobile	2	2
Case Comparisons in My Research		

Figure 8.1. The Improvement of Case Comparisons – Interviews

Moreover, my research was carefully designed for cross-functional and cross-industrial comparisons. Lam (2003) looks over the differences of knowledge sourcing according to firm-origin, whereas my research is distinguished from it in the variations of functional and industrial contexts. The 4 R&D subsidiaries and 4 marketing subsidiaries of 4 MNCs are employed for the qualitative approach as depicted in Figure 8.1. A point to take is that Lam (2003) only has one firm in each

segment whereby it might not represent the features of the segment very well. In contrast, my research has two companies in each segment whereby it can improve the validity of comparisons.

Investigating how the variation of R&D and marketing functions has an influence on multiple variables is another strong point. The findings indicate the main effects of R&D and marketing on these variables in my research. However, there may be influences by other factors on the main effects and they need to be reviewed to clarify the main effects. Additional multivariate analysis was performed for this reason with some objectives. The first objective was to look at the effect by the variation of ICT and automobile industries. In addition, whether interaction effects between industrial sectors and functions exist had to be checked. This type of effects can occur when one independent variable interferes in another differently from main effects. The descriptive statistics of survey data reveal that there are differences in project team size as well. Therefore, the effect by project team size had to be investigated in comparing when it is controlled and when it is not controlled. Finally, the type I error had to be checked through additional multivariate analysis. When eight dependent variables are tested separately, a type I error may occur by isolated dependent variables. To examine whether a difference of R&D and marketing about a dependent variable is real, a multivariate analysis had to be performed.

Multi-way multivariate analysis of variance (multi-way MANOVA) and multi-way multivariate analysis of covariance (multi-way MANCOVA)

were employed to analyse the above issues. These two different tests aimed to compare test results when project team size and countries of origin were controlled as covariates or not. At this time, sectors (ICT or automobile industries) and functions (R&D or marketing) were categorical independent variables. Dependent variables regarding local team relationships, cross-national work structures, and HRM were set carefully as described in Table 1.2. Project team size and countries of origin were used as covariates and their effects were removed in the multi-way MANCOVA model. Multiple regression analysis and logistic regression analysis were initially considered. However, a MANCOVA model was better than a regression model in order to use project team size and countries of origin as control variables. Logit and probit models cannot be used either because dependent variables must be present in a nominal scale. Although my study has categorical variables such as sectors and functions, using them as dependent variables can obstruct the focus on what R&D and marketing differently affect. Previous studies in HRM configuration hardly used this multivariate analysis of variance.

8.4.2 Limitations

Measurement items were gained from previous studies to build a survey questionnaire. In this process, some expected variables could not have enough measurement items. This problem was partly solved by supplementing it with interview results. In addition, there was a limitation in building comparative research design even though it was

reasonably performed. My research wanted to study industrial and functional variations holding the home and host environment constant. For this, I needed to visit R&D and marketing subsidiaries located in the same country. Some of the selected MNCs, however, did not have both of their R&D centre and business corporation in the same country. The UK and the US were thus tied as a host country because the country characteristics of the UK and the US were not much different in cultural proximity. Finally, my research samples were chosen from leading companies of 2010 Fortune Global 500. Research findings are generalized in a specific context of world-renowned MNCs on the basis of the sampling. If an MNC does not have a world-class work system with a high performance, my research findings may not be applied into its organisations.

8.5 Recommendations for Future Research

Many HRM studies linked to knowledge transfer have been dealt with the best practices for higher performance or competitive advantage. More sophisticated HRM practices for MNC outcomes have been able to be identified as a result. Nevertheless, it is still important to explore organisational contexts that affect the MNC outcomes and reflect causal factors in HRM practices. My research clearly indicates that the contexts of organisational relationships and work structures should be reviewed carefully for the better settings of HRM. These causal factors could be found in comparing R&D with marketing subsidiaries and ICT with

automobile subsidiaries. Many studies focus on technical and technological knowledge in R&D organisations without dealing other types of knowledge resources. This phenomenon results from the fact that their main concern is systematic innovation in organisations. However, two kinds of knowledge resources, marketing knowledge and R&D knowledge, should be considered on an equivalent basis in research. Electronics companies such as Siemens and Samsung operate independent marketing and R&D organisations all over the world. This fact shows that knowledge in both of them can be key resources for the viability of firms, especially in the ICT industry. Simonin (1999a) and Schlegelmilch and Chini (2003) reveal that the transfer of marketing knowledge is strategically important to MNCs although it is not easy to be transferred.

Therefore, future research should focus more on the different types of subsidiaries and their local environment. My research focused on project outcomes as created and transferred knowledge. Some tacit knowledge such as marketing know-how could not be investigated directly for the reason. My research mainly addresses the value of project-oriented HRM settings for MNC knowledge transfer in the contexts of comparative empirical studies. If future research can treat other types of knowledge, causal relationships in knowledge processes will be clearer. In addition, my research investigated world-renowned big MNCs only and thus findings cannot be generalized in smaller companies. The rest will be up to future studies so that other specific contexts can be

explored in empirical studies. An MNC study cannot deal with several contexts simultaneously because of time and space restraints for data collection. Future studies thus have an important mission to confirm that academic findings limited in a specific situation are significant even in other contexts. I hope that causal factors in my research can be tested in some other contexts through valid and reliable approaches.

8.6 Reflection on the Research Process

My research project made progress in combining qualitative and quantitative approaches to increase validity of results. The coverage of research results could be extended through additional quantitative approach. Uncertainty in the interpretation can be reduced when a proposition is confirmed by two or more independent measurement processes (Webb et al., 1966). Creswell and Plano-Clark (2006) similarly state that the use of quantitative and qualitative approaches in combination can result in better research across social science, providing a better understanding of research problems than either approach alone. Employing these approaches together was a good point in order to get valid and reliable results. However, this mixed method required much more effort and time to meet as many people as possible in a limited time period. It was not easy to access MNC subsidiaries because they had a number of highly confidential information and were reluctant to talk about it. I take pride in having been able to complete surveys, interviews, and necessary data sets in time.

When research is designed in two different research methods, it can cause a crash between the ontological and epistemological position. This philosophical discrepancy is resolved by two parts of ontological realism and epistemological relativism in Bhaskar (1975), whereby research can add rationality to itself. For this reason, I considered research findings on the basis of critical realism. Modell (2007) mentions that critical realism provides a unified and consistent philosophical foundation for combining methods and theories associated with typical patterns of a theme. What I wanted to examine could be explored through both qualitative and quantitative approaches with philosophical soundness. Quantitative and qualitative techniques could be complementary to better understand casual relationships in research results, expanding them and discovering what has been missed. Both approaches helped research make rational choices of scattered concepts and theories in using deduction and induction to understand a mechanism more effectively. The term of contexts has been mentioned continuously in this thesis. This is because contexts are essential to research in critical realism in recognizing the openness of the social science system. My research thus reveals that MNC knowledge processes are differently shaped in the specific local contexts of foreign subsidiaries. Philosophical thinking in empirical research helped me develop contributable knowledge through analysing, reasoning, and explaining my academic interest.

8.7 Concluding Comments

There are some factors that distinguish the knowledge processes of R&D and marketing. The relevant issues have been discussed in this research and hidden causal factors across empirical findings were identified specifically in the previous discussion chapter. My research is interested in the more bottom–up process of how knowledge is created and transferred from subsidiaries. The distinctive knowledge nature of R&D and marketing is shaped from different working conditions such as task interdependence and autonomy. HRM also needs to be set in considering differences between the knowledge processes of R&D and marketing. Finally, this chapter has briefly reviewed the structure of my PhD research and presented some limitations and recommendations for future research. More clarified organisational implications and HRM fits across ICT-R&D, ICT-marketing, automobile-R&D, and automobile-marketing should be treated in the near future.

BIBLIOGRAPHY

Acock, A. C. (2008). *A gentle introduction to stata, Second edition*. Texas: Stata Press.

Aguinis, H. (1995). Statistical power with moderated multiple regression in management research. *Journal of Management,* 21(6), pp. 1141-1158.

Allen, M. P. (1997). *Understanding regression analysis*. New York: Plenum Press.

Almeida, P. and Phene, A. (2004). Subsidiaries and knowledge creation: The influence of the MNC and host country on innovation. *Strategic Management Journal*, 25(8-9), pp. 847-864.

Anand, K. S. and Mendelson, H. (1997). Information and organization for horizontal multimarket coordination. *Management Science*, 43(12), pp. 1609-1627.

Ardichvili, A., Page, V., and Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*, 7(1), pp. 64-77.

Argote, L., McEvily, B., and Reagans, R. (2003). Introduction to the special issue on managing knowledge in organizations: Creating, retaining, and transferring knowledge. *Management Science*, 49(4), pp. v-viii.

Arthur, J. B. (1992). The link between business strategy and industrial relations systems in American steel minimills. *Industrial and Labor Relations Review*, 45(3), pp. 488-506.

Athanassiou, N. and Nigh, D. (2000). Internationalization, tacit knowledge, and the top management teams of MNCs. *Journal of International Business Studies*, 31(3), pp. 471-487.

Aydin, N. and Terpstra, V. (1981). Marketing know-how transfers by multinationals: A case study in Turkey. *Journal of International Business Studies*, 12(3), pp. 35-48.

Babbie, E. (2007). *The practice of social research, Eleventh edition*. California: Thomson Wadsworth.

Bae, J. and Lawler, J. (2000). Organizational and HRM strategies in Korea: Impact on firm performance in an emerging economy. *Academy of Management Journal*, 43(3), pp. 502-517.

Bae, J. and Rowley, C. (2001). The impact of globalisation on HRM: The case of South Korea. *Journal of World Business*, 36(4), pp. 402-428.

Baliga, B. R. and Jaeger, A. M. (1984). Multinational corporations: Control systems and delegation issues. *Journal of International Business Studies*, 15(2). pp. 25-40.

Baltes, B. B., Dickson, M. W., Sherman, M. P., Bauer, C. C., and LaGanke, J. S. (2002). Computer-mediated communication and group decision making: A meta-analysis. *Organizational Behavior and Human Decision Processes*, 87(1), pp. 156-179.

Baregheh, A., Rowley, J., and Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision*, 47(8), pp. 1323-1339.

Barney, J. B. (2007). *Gaining and sustaining competitive advantage, Third edition*. New Jersey: Prentice Hall.

Barney, J. B. (2002). *Gaining and sustaining competitive advantage, Second edition*. New Jersey: Prentice Hall.

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), pp. 99-120.

Bartlett, J. E., II, Kotrlik, J. W., and Higgins, C. C. (2001). Organizational research: Determining appropriate sample size for survey research. *Information Technology, Learning, and Performance Journal*, 19(1), pp. 43-50.

Baron, R. M. and Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), pp. 1173-1182.

Batt, R., Colvin, A. J., and Keefe, J. (2002). Employee voice, human resource practices, and quit rates: Evidence from the telecommunications industry. *Industrial and Labor Relations Review*, 55(4), pp. 573-594.

Becker, B. E. and Gerhart, B. (1996). The impact of human resource management on organizational performance: Progress and prospects. *Academy of Management Journal*, 39(4), pp. 779-801.

Bhagat, R. S., Kedia, B. L., Harveston, P. D., and Triandis, H. C. (2002). Cultural variations in the cross-border transfer of organizational

knowledge: An integrative framework. *Academy of Management Review*, 27(2), pp. 204-221.

Bhaskar, R. (1975). *A realist theory of science*. London: Verso, pp. 7-62.

Bierly III, P. E., Damanpour, F., and Santoro, M. D. (2009). The application of external knowledge: Organizational conditions for exploration and exploitation. *Journal of Management Studies*, 46(3), pp. 481-509.

Birkinshaw, J. M. and Morrison, A. J. (1995). Configuration of strategy and structure in subsidiaries of multinational corporations. *Journal of International Business Studies*, 26(4), pp.729-754.

Björkman, I., Barner-Rasmussen, W., and Li, L. (2004). Managing knowledge transfer in MNCs: The impact of headquarters control mechanisms. *Journal of International Business Studies*, 35(5), pp. 443-455.

Bloom, M. and Michel, J. G. (2002). The relationships among organizational context, pay dispersion, and managerial turnover. *Academy of Management Journal*, 45(1), pp. 33-42.

Bowen, D. E. and Ostroff, C. (2004). Understanding HRM-firm performance linkages: The role of the "strength" of the HRM system. *Academy of Management Review*, 29(2), pp. 203-221.

Boxall, P. and Macky, K. (2007). High-performance work systems and organisational performance: Bridging theory and practice. *Asia Pacific Journal of Human Resources*, 45(3), pp. 261-270.

Brinkley, I. (2009). *Manufacturing and the knowledge economy: A knowledge economy programme report*. London: The Work Foundation.

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford Press.

Bryman, A. (2008). *Social research methods, Third edition*. Oxford: Oxford University Press.

Bums, T. and Stalker, G. M. (1961). *The management of innovation*. London: Tavistock Institute.

Byosiere, P. and Luethge, D. J. (2008). Knowledge domains and knowledge conversion: An empirical investigation. *Journal of Knowledge Management*, 12(2), pp. 67-78.

Cabrera, E. F. and Cabrera, A. (2005). Fostering knowledge sharing through people management practices. *International Journal of Human Resource Management*, 16(5), pp. 720-735.

Carlile, P. R. (2002). A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organization Science*, 13(4), pp. 442-455.

Cavusgil, S. T., Knight, G., and Riesenberger, J. R. (2008). *International business: Strategy, management, and the new realities*. New Jersey: Pearson Prentice Hall.

Chandler, A. D. (1962). *Strategy and structure: Chapters in the history of the American industrial enterprise*. Massachusetts: The MIT Press.

Chen, Y. F. and Tjosvold, D. (2005). Cross-cultural leadership: Goal interdependence and leader-member relations in foreign ventures in China. *Journal of International Management*, 11(3), pp. 417-439.

Child, J. (1972). Organization structure, environment and performance: The role of strategic choice. *Sociology*, 6(1), pp. 1-22.

Chini, T. C. and Ambos, B. (2006). Knowledge transfer processes in multinational companies: Enhancing the speed of knowledge transfer. *Global, national, and local practices in multinational companies*. Eds. Geppert, M. and Mayer, M. New York: Palgrave Macmillan, pp. 146-163.

Ciabuschi, F., Martín, O. M., Ståhl, B. (2010). Headquarters' influence on knowledge transfer performance. *Management International Review*, 50(4), pp. 471–491.

Claus, L. (2003). Similarities and differences in human resource management in the European Union. *Thunderbird International Business Review*, 45(6), pp. 729-755.

Cohen, W. M. and Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), pp. 128-152.

Cortina, J. M. (1994). Interaction, nonlinearity, and multicollinearity: Implications for multiple regression. *Journal of Management*, 19(4), pp. 915-922.

Cox, T. H., Lobel, S. A., and Mcleod, P. L. (1991). Effects of ethnic group cultural differences on cooperative and competitive behavior on a group task. *Academy of Management Journal*, 34(4), pp. 827-847.

Cray, D. (1984). Control and Coordination in Multinational Corporations. *Journal of International Business Studies*, 15(2), pp. 85-98.

Creswell, J. W. and Plano-Clark, V. L. (2006). *Designing and conducting mixed methods of research*. California: SAGE Publications.

Cummings, J. N. (2004). Work groups, structural diversity, and knowledge sharing in a global organization. *Management Science*, 50(3), pp. 352-364.

Daft, R. L. (1978). A dual-core model of organizational innovation. *Academy of Management Journal*, 21(2), pp. 193-210.

Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum Press.

Deci, E. L. and Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.

Deci, E. L., Connell, J. P., and Ryan, R. M. (1989). Self-determination in a work organization. *Journal of Applied Psychology*, 74(4), pp. 580-590.

Delery, J. E. and Doty, D. H. (1996). Modes of theorizing in strategic human resource management: Tests of universalistic, contingency, and configurational performance predictions. *Academy of Management Journal*, 39(4), pp. 802-835.

Dixon, N. M. (1994). *The organizational learning cycle: How we can learn collectively*. Maidenhead: McGraw-Hill.

Donaldson, L. (2001). *The contingency theory of organizations*. California: Sage Publications.

Donaldson, L. (1987). Strategy and structural adjustment to regain fit and performance: In defence of contingency theory. *Journal of Management Studies*, 24(1), pp. 1-24.

Drazin, R. and Van de Ven, A. H. (1985). Alternative forms of fit in contingency theory. *Administrative Science Quarterly*, 30(4), pp. 514-539.

Durkheim, E. (1983). *Pragmatism and sociology*. Cambridge: Cambridge University Press.

Dyer, J. H. and Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23(4), pp. 660-679.

Earley, P. C. and Gibson, C. B. (2002). *Multinational work teams: A new perspective*. New Jersey: Lawrence Erlbaum.

Edwards, P. and Collinson, M. (2002). Empowerment and managerial labor strategies: Pragmatism regained. *Work and Occupations*, 29(3), pp. 272-299.

Edwards, R., Ahmad, A., and Moss, S. (2002). Subsidiary autonomy: The case of multinational subsidiaries in Malaysia. *Journal of International Business Studies*, 33(1). pp. 183-191.

Engel, R. J. and Schutt, R. K. (2009). *The practice of research in social work, Second edition*. London: Sage Publications.

Enright, M. J. and Subramanian, V. (2007). An organizing framework for subsidiary typologies. *Management International Review*, 47(6), pp. 895-924.

Eriksson, K., Johanson, J., Majkgard, A., and Sharma, D. D. (1997). Experiential knowledge and cost in the internationalization process. *Journal of International Business Studies*, 28(2). pp. 337-360.

Fang, A., Jiang, G. F., Makino, S., and Beamish., P. W. (2010). Multinational firm knowledge, use of expatriates, and foreign subsidiary performance. *Journal of Management Studies*, 47(1), pp. 27-54.

Fatehi, K. (1996). *International management: A cross-cultural and functional perspective*. New Jersey: Prentice Hall.

Feinberg, S. E. and Gupta, A. K. (2004). Knowledge spillovers and the assignment of R&D responsibilities to foreign subsidiaries. *Strategic Management Journal*, 25(8-9), pp. 823-845.

Ferner, A. (2000). The underpinnings of bureaucratic control systems: HRM in European multinationals. *Journal of Management Studies*, 37(4), pp. 521-540.

Ferner, A. (1997). Country of origin effects and HRM in multination companies. *Human Resource Management Journal*, 7(1), pp. 19-37.

Ferner, A., Almond, P., Clark, I., Colling, T., Edwards, T., Holden, L., and Muller-Camen, M. (2004). Dynamics of central control and subsidiary autonomy in the management of human resources: Case-study evidence from US MNCs in the UK. *Organization Science*, 25(3), pp. 363-391.

Ferner, A., Tregaskis, O., Edwards, P., Edwards, T., Marginson, P., Adam, D., and Meyer, M. (2011). HRM structures and subsidiary discretion in foreign multinationals in the UK. *International Journal of Human Resource Management*, 22(3), pp. 483-509.

Ferris, G. R., Hochwarter, W. A., Douglas, C., Blass, F. R., Kolodinsky, R. W., and Treadway, D. C. (2002). Social influence processes in organizations and human resources systems. *Research in personnel and human resources management*, 21. Eds. Ferris, G. R. and Martocchio, J. J. Oxford: JAI/Elsevier Science, pp. 65-127.

Fiol, C. M. and Lyles, M. A. (1985). Organizational learning. *Academy of Management Review*, 10(4), pp. 803-813.

Fleetwood, S. (2005). Ontology in organization and management studies: A critical realist perspective. *Organization*, 12(2), pp. 197-222.

Fleetwood, S. and Hesketh, A. (2006). HRM-performance research: Undertheorized and lacking explanatory power. *International Journal of Human Resource Management*, 17(12), pp. 1977-1993.

Fombrun, C. J., Tichy, N. M., and Devanna, M. A. (1984). *Strategic human resource management*. New York: Wiley.

Ford, J. K., MacCallum, R. C., and Tait, M. (1986). The application of exploratory factor analysis in applied psychology: A critical review and analysis. *Personnel Psychology*, 39(2), pp. 291-314.

Foss, N. J. (2007). The emerging knowledge governance approach: Challenges and characteristics. *Organization*, 14(1), pp. 29-52.

Foss, N. J. and Pedersen, T. (2004). Organizing knowledge processes in the multinational corporation: an introduction. *Journal of International Business Studies*, 35(5), pp. 340-349.

Foss, N. J. and Pedersen, T. (2002). Transferring knowledge in MNCs: The role of sources of subsidiary knowledge and organizational context. *Journal of International Management*, 8(1), pp. 49-67.

Fry, L. W., Kerr, S., and Lee, C. (1986). Effects of different leader behaviors under different levels of task interdependence. *Human Relations*, 39(12), pp. 1067-1081.

Gagné, M. and Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26(4), pp. 331-362.

Ganzach, Y. (1998). Nonlinearity, multicollinearity and the probability of type II error in detecting interaction. *Journal of Management*, 24(5), pp. 615-622.

Garcia-Pont, C., Canales, J. I., and Noboa, F. (2009). Subsidiary strategy: The embeddedness component. *Journal of Management Studies*, 46(2), pp. 182-214.

Gardner, D. G., Dyne, L., and Pierce, J. L. (2004). The effects of pay level on organization-based self-esteem and performance: A field study. *Journal of Occupational and Organizational Psychology*, 77(3), pp. 307-322.

George, D. and Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference, 11.0 update, Fourth edition*. Massachusetts: Allyn & Bacon.

Ghoshal, S., Korine, H., and Szulanski, G. (1994). Interunit communication in multinational corporations. *Management Science*, 40(1), pp. 96-110.

Gittel, J. H. (2000). Organizing work to support relational co-ordination. *International Journal of Human Resource Management*, 11(3), pp. 517-539.

Gladstein, D. L. (1984). Groups in context: A model of task group effectiveness. *Administrative Science Quarterly*, 29(4), pp. 499-517.

Goodnight, R. (2004). Laissez-faire leadership. *Encyclopedia of leadership*. Eds. Goethals, G. R., Sorenson, G. J., and Burns, J. M. California: SAGE Publication, pp. 821-824.

Gourlay, S. (2006). Conceptualizing knowledge creation: A critique of Nonaka's theory. *Journal of Management Studies*, 43(7), pp. 1415-1436.

Graen, G., Novak, M. A., and Sommerkamp, P. (1982). The effects of leader—member exchange and job design on productivity and satisfaction: Testing a dual attachment model. *Organizational Behavior and Human Performance*, 30(1), pp. 109-131.

Grandori, A. and Kogut, B. (2002). Dialogue on organization and knowledge. *Organization Science*, 13(3), pp. 224-231.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), pp. 1360-1380.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17, pp. 109-122.

Guest, D. E. (1997). Human resource management and performance: A review and research agenda. *International Journal of Human Resource Management*, 8(3), pp. 264-276.

Gulati, R., Nohria, N., and Zaheer, A. (2000). Strategic networks. *Strategic Management Journal*, 21(3), pp. 203-215.

Gupta, A. K. and Govindarajan, V. (2001). Converting global presence into global competitive advantage. *Academy of Management Executive*, 15(2), pp. 45-56.

Gupta, A. K. and Govindarajan, V. (2000). Knowledge flows within multinational corporations. *Strategic Management Journal*, 21(4), pp. 473-496.

Gupta, A. K. and Govindarajan, V. (1994). Organizing for knowledge flows within MNCs. *International Business Review*, 43(4), pp. 437-457.

Gupta, A. K. and Govindarajan, V. (1991). Knowledge flows and the structure of control within multinational corporations. *Academy of Management Review*, 16(4), pp. 768-792.

Guthrie, J. (2001). High-involvement work practices, turnover, and productivity: Evidence from New Zealand. *Academy of Management Journal*, 44(1), pp. 180-191.

Hall, R. (1992). The strategic analysis of intangible resources. *Strategic Management Journal*, 13(2), pp. 135-144.

Hallin, C. and Lind, C. H. (2012). Revisiting the external impact of MNCs: An empirical study of the mechanisms behind knowledge

spillovers from MNC subsidiaries. *International Business Review*, 21(2), pp. 167-179.

Hamilton, B. H., Nickerson, J. A., and Owan, H. (2003). Team incentives and worker heterogeneity: An empirical analysis of the impact of teams on productivity and participation. *Journal of Political Economy*, 111(3), pp. 465-497.

Hansen, M. T. (2002). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), pp. 232-248.

Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across knowledge across organization subunits. *Administrative Science Quarterly*, 44(1), pp. 82-111.

Hansen, M. T., Nohria, N., and Tierney, T. (1999). What's your strategy for managing knowledge?. *Harvard Business Review*, March-April, pp. 106-116.

Harzing, A. W. (2000). An empirical test and extension of the Bartlett and Ghoshal typology of multinational companies. *Journal of International Business Studies*, 31(1), pp. 101-120.

Harzing, A. W. and Noorderhaven, N. G. (2006). Knowledge flows in MNCs: An empirical test and extension of Gupta & Govindarajan's typology of subsidiary roles, *International Business Review*, 15(3) pp. 195-214.

Hickson, D. J., Pugh, D. S., and Pheysey, D. C. (1969). Operations technology and organization structure: An empirical reappraisal. *Administrative Science Quarterly*, 14(3), pp. 378-398.

Hirst, M. K. (1988). Intrinsic motivation as influenced by task interdependence and goal setting. *Journal of Applied Psychology*, 73(1), pp. 96-101.

Hislop, D. (2005). *Knowledge management in organizations: A critical introduction*. Oxford: Oxford University Press.

Hoaglin, D. C. and Welsch, R. E. (1978). The hat matrix in regression and ANOVA. *The American Statistician*, 32(1), pp. 17-22.

Hocking, J. B., Brown, M., and Harzing, A. W. (2007). Balancing global and local strategic contexts: Expatriate knowledge transfer, applications, and learning within a transnational organization. *Human Resource Management*, 46(4), pp. 513-533.

Howells, J. R. (2002). Tacit knowledge, innovation and economic geography. *Urban Studies*, 39(5-6), pp. 871-884.

Huang, J. C. and Wang, S. F. (2002). Knowledge conversion abilities and knowledge creation and innovation: A new perspective on team composition. In *European Conference on Organizational Knowledge, Learning, and Capabilities*, 3.

Huselid, M. A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, 38(3), pp. 635-672.

Huselid, M. A. and Becker, B. E. (2011). Bridging micro and macro domains: Workforce differentiation and strategic human resource management. *Journal of Management*, 37(2), pp. 421-428.

Huselid, M. A., Jackson, S. E., and Schuler, R. S. (1997). Human resource management effectiveness as determinants of firm performance. *Academy of Management Journal*, 40(1), pp. 171-188.

Hyde, P., Harris, C., Boaden, R., and Cortvriend, P. (2009). Human relations management, expectations, and healthcare: A qualitative study. *Human Relations*, 62(5), pp. 701-725.

Ichniowski, C. and Shaw, K. (2003). Beyond incentive pay: Insiders' estimates of the value of complementary human resource management practices. *The Journal of Economic Perspectives*, 17(1), PP. 155-180.

Ichniowski, C., Shaw, K., and Prennushi, G. (1997). The effects of human resource management practices on productivity: A study of steel finishing lines. *American Economic Review*, 87(3), pp. 291-313.

Jackson, S. E. and Schuler, R. S. (1995). Understanding human resource management in the context of organizations and their environments. *Annual Review of Psychology*, 46(1), pp. 237-264.

Jansen, J. J., Van Den Bosch, F. A., and Volberda, H. W. (2005). Managing potential and realized absorptive capacity: How do organizational antecedents matter?. *Academy of Management Journal*, 48(6), pp. 999-1015.

Janz, B. D., Colquitt, J. A., and Noe, R. A. (1997). Knowledge worker team effectiveness: The role of autonomy, interdependence, team development, and contextual support variables. *Personnel Psychology*, 50(4), pp. 877-904.

Johnson, P. and Duberley, J. (2000). *Understanding management research: An introduction to epistemology*. London: SAGE.

Johnston, S. (2005). *Headquarters and subsidiaries in multinational corporations: Strategies, tasks, and coordination*. New York: Palgrave Macmillan.

Jung, D. I. and Avolio, B. J. (1999). Effects of leadership style and followers' cultural orientation on performance in group and individual task conditions. *Academy of Management Journal*, 42(2), pp. 208-218.

Kamoche, K. (1997). Knowledge creation and learning in international HRM. *International Journal of Human Resource Management*, 8(2), pp. 213-225.

Kang, S. C., Morris, S. S., and Snell, S. A. (2007). Relational archetypes, organizational learning, and value creation: Extending the human resource architecture. *Academy of Management Review*, 32(1), pp. 236-256.

Keller, R. T. (1994). Technology-information processing fit and the performance of R&D project groups: A test of contingency theory. *Academy of Management Journal*, 37(1), pp. 167-179.

Kiesler, S. and Sproull, L. (1992). Group decision making and communication technology. *Organizational Behavior & Human Decision Processes*, 52(1), pp. 96 -123.

Kiggundu, M. N. (1981). Task interdependence and the theory of job design. *Academy of Management Review*, 6(3), pp. 499-508.

Kimberly, J. R. and Evanisko, M. J. (1981). Organizational innovation: The influence of individual, organizational, and contextual factors on hospital adoption of technological and administrative innovations. *Academy of Management Journal*, 24(4), pp. 689-713.

Kirkman, B. L., Rosen, B., Tesluk, P. E., and Gibson, C. B. (2004). The impact of team empowerment on virtual team performance: The moderating role of face-to-face interaction. *Academy of Management Journal*, 47(2), pp. 175-192.

Kogut, B. and Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(3), pp. 383-397.

Kostova, T. and Roth, K. (2002). Adoption of an organizational practice by subsidiaries of multinational corporations: Institutional and relational effects. *Academy of Management Journal*, 45(1), pp. 215-233.

Kotabe, M., Dunlap-Hinkler, D., Parente, R., and Mishra, H. A. (2007). Determinants of cross-national knowledge transfer and its effect on firm innovation. *Journal of International Business Studies*, 38(2), pp. 259-282.

Kotabe, M., Martin, X., and Domoto, H. (2003). Gaining from vertical partnerships: Knowledge transfer, relationship duration, and supplier performance improvement in the US and Japanese automotive industries. *Strategic Management Journal*, 24(4), pp. 293-316.

Krackhardt, D. (1992). The strength of strong ties: The importance of philos in organizations. *Networks and organizations: Structure, form, and action*. Eds. Nohria, N. and Eccles, R. G. Massachusetts: Harvard Business School Press, pp. 216-239.

Kraimer, M. L. and Wayne, S. J. (2004). An examination of perceived organizational support as a multidimensional construct in the context of expatriate assignment. *Journal of Management*, 30(2), pp. 209-237.

Kurokawa, S., Iwata, S., and Roberts, E. B. (2007). Global R&D activities of Japanese MNCs in the US: A triangulation approach. *Research Policy*, 36(1), pp. 3-36.

Kuvaas, B. (2006). Work performance, affective commitment, and work motivation: The roles of pay administration and pay level. *Journal of Organizational Behavior*, 27(3), pp. 365-385.

Lam, A. (2003). Organizational learning in multinationals: R&D networks of Japanese and US MNEs in the UK. *Journal of Management Studies*, 40(3), pp. 673-703.

Lam, A. (2000). Tacit knowledge, organizational learning and societal institutions: An integrated framework. *Organization Studies*, 21(3), pp. 487-513.

Lam, A. (1997). Embedded firms, embedded knowledge: Problems of collaboration and knowledge transfer in global cooperative ventures. *Organization Studies*, 18(6), pp. 973-996.

Langfred, C. W. (2007). The downside of self-management: A longitudinal study of the effects of conflict on trust, autonomy, and task interdependence in self-managing teams. *Academy of Management Journal*, 50(4), pp. 885-900.

Lasserre, P. (2007). *Global strategic management, Second edition*. New York: Palgrave Macmillan.

Lawrence, P. R. and Lorsch, J. W. (1967). Differentiation and integration in complex organizations. *Administrative Science Quarterly*, 12(1), pp. 1-47.

Lawson, C. and Lorenz, E. (1999). Collective learning, tacit knowledge and regional innovative capacity. *Regional Studies*, 33(4), pp. 305-317.

Lepak, D. P. and Snell, S. A. (2003). Managing the human resource architecture for knowledge-based competition. *Managing Knowledge for sustained competitive advantage*. Eds. Jackson, S. E., Hitt, M. A., and DeNisi, A. S. California: Jossey-Bass, pp. 127-154.

Lepak, D. P. and Snell, S. A. (2002). Examining the human resource architecture: The relationships among human capital, employment,

and human resource configurations. *Journal of Management*, 28(4), pp. 517-543.

Lepak, D. P. and Snell, S. A. (1999). The human resource architecture: Toward a theory of human capital allocation and development. *Academy of Management Review*, 24(1), pp. 31-48.

Li, L. (2005). The effects of trust and shared vision on inward knowledge transfer in subsidiaries' intra- and inter-organizational relationships. *International Business Review*, 14(1), pp. 77-95.

Lichtenthaler, U. and Lichtenthaler, E. (2010). Technology transfer across organizational boundaries: Absorptive capacity and desorptive capacity. *California Management Review*, 53(1), pp. 154-170.

Liden, R. C., Erdogan, B., Wayne, S. J., and Sparrowe, R. T. (2006). Leader-member exchange, differentiation, and task interdependence: Implications for individual and group performance. *Journal of Organizational Behavior*, 27(6), pp. 723-746.

Liden, R. C., Wayne, S. J., and Bradway, L. K. (1997). Task interdependence as moderator of the relation between group control and performance. *Human Relations*, 50(2), pp. 169-181.

Locke, R. M. and Thelen, K. (1995). Apples and oranges revisited: Contextualized comparisons and the study of comparative labour politics. *Politics and Society*, 23(3), pp. 337-367.

MacDuffie, J. P. (1995). Human resource bundles and manufacturing performance: Organizational logic and flexible production systems

in the world auto industry. *Industrial and Labor Relations Review*, 48(2), pp. 197-221.

Mahnke, V., Pedersen, T., and Venzin, M. (2005). The impact of knowledge management on MNC subsidiary performance: The role of absorptive capacity. *Management International Review*, 45(2), pp. 101-119.

Mäkelä, K. and Brewster, C. (2009). Interunit interaction contexts, interpersonal social capital, and the differing levels of knowledge sharing. *Human Resource Management*. 48(4), pp. 591-613.

Malhotra, A., Gosain, S., and Sawy, O. A. E. (2005). Absorptive capacity configurations in supply chains: Gearing for partner-enabled market knowledge creation. *MIS Quarterly,* 29(1), pp. 145-187.

Malnight, T. W. (1996). The transition from decentralized to network-based MNC structures: An evolutionary perspective. *Journal of International Business Studies*, 27(1), pp. 43-65.

Martín-de-Castro, G., López-Sáez, P., and Navas-López, J. E. (2008). Processes of knowledge creation in knowledge-intensive firms: Empirical evidence from Boston's Route 128 and Spain. *Technovation*, 28(4), pp. 222-230.

Martinez, J. I. and Jarillo, J. C. (1991). Coordination demands of international strategies. *Journal of International Business Studies*. 22(3), pp. 429-444.

Maskell, P. and Malmberg, A. (1999). Localised learning and industrial competitiveness. *Cambridge Journal of Economics*, 23(2), pp. 167-185.

Maznevski, M. L. and Chudoba, K. M. (2000). Bridging space over time: Global virtual team dynamics and effectiveness. *Organization Science*, 11(5), pp. 473-492.

McEvily, S. K., Eisenhardt, K. M., and Prescott, J. E. (2004). The global acquisition, leverage, and protection of technological competencies. *Strategic Management Journal*, 25(8-9), pp. 713-722.

Meyer, K. E., Mudambi, R., and Narula, R. (2011). Multinational enterprises and local contexts: The opportunities and challenges of multiple embeddedness. *Journal of Management Studies*, 48(2), pp. 235-252.

Miles, R. E. and Snow, C. C. (1984). Designing strategic human resources systems. *Organizational Dynamics*, 13(1), pp. 36-52.

Milkovich, G. T. and Newman, J. M. (2008). *Compensation, Ninth edition*. New York: McGraw-Hill/Irwin.

Milliman, J., Glinow, M. A., and Nathan, M. (1991). Organizational life cycles and strategic international human resource management in multinational companies: Implications for congruence theory. *Academy of Management Review*, 16(2), pp. 318-339.

Millmore, M., Lewis, P., Saunders, M., Thornhill, A., and Morrow, T. (2007). *Strategic human resource management: Contemporary issues*. Essex: Prentice Hall.

Minbaeva, D. B. (2008). HRM practices affecting extrinsic and intrinsic motivation of knowledge receivers and their effect on intra-MNC knowledge transfer. *International Business Review*, 17(6), pp. 703-713.

Minbaeva, D. B. (2007). Knowledge transfer in multinational corporations. *Management International Review*, 47(4), pp. 567-593.

Minbaeva, D. B. (2005). HRM practices and MNC knowledge transfer. *Personnel Review*, 34(1), pp. 125-144.

Minbaeva, D. B. and Michailova, S. (2004). Knowledge transfer and expatriation in multinational corporations: The role of disseminative capacity. *Employee Relations*, 26(6), pp. 663-679.

Minbaeva, D. B., Foss, N., and Snell, S. (2009). Bringing the knowledge perspective into HRM. *Human Resource Management*, 48(4), pp. 477-483.

Minbaeva, D. B., Pedersen, T., Björkman, I., Fey, C. F., and Park, H. J. (2003). MNC knowledge transfer, subsidiary absorptive capacity, and HRM. *Journal of International Business Studies*, 34(6), pp. 586-599.

Miner, J. B. (2006). *Organizational behavior 2: Essential theories of process and structure*. London: M. E. Sharpe.

Modell, S. (2007). *Integration of qualitative and quantitative methods in management accounting research: A critical realist approach*. Available at SSRN: http://ssrn.com/abstract=997194.

Morrison, D. F. (1976): *Multivariate statistical methods, Second edition*. New York: McGraw-Hill.

Mudambi, R. and Navarra, P. (2004). Is knowledge power? Knowledge flows, subsidiary power and rent-seeking within MNCs. *Journal of International Business Studies*, 35(5), pp. 385–406.

Ngo, H., Turban, D., Lau, C., and Lui, S. (1998). Human resource practices and firm performance of multinational corporations: Influences of country origin. *International Journal of Human Resource Management*, 9(4), pp. 632-652.

Nickerson, J. A. and Zenger, T. R. (2004). A knowledge-based theory of the firm: The problem-solving perspective. *Organization Science*, 15(6), pp. 617-632.

Nobel, R. and Birkinshaw, J. (1998). Innovation in multinational corporations: Control and communication patterns in international R&D operations. *Strategic Management Journal*, 19(5), pp. 479-496.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), pp. 14-37.

Nonaka, I. and Konno, N. (1998). The concept of "ba": Building a foundation for knowledge creation. *California Management Review*, 40(3), pp. 40-54.

Nonaka, I. and Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.

Nonaka, I. and Toyama, R. (2003). The knowledge-creating theory revisited: Knowledge creation as a synthesizing process. *Knowledge Management Research & Practice*, 1(1), pp. 2-10.

Nonaka, I. and Von Krogh, G. (2009). Perspective - Tacit knowledge and knowledge conversion: Controversy and advancement in organizational knowledge creation theory. *Organization Science*, 20(3), pp. 635-652.

Nonaka, I., Toyama, R., and Konno, N. (2000). SECI, ba and leadership: A unified model of dynamic knowledge creation. *Long Range Planning*, 33(1), pp. 5-34.

Nonaka, I., Von Krogh, G., and Voelpel, S. (2006). Organizational knowledge creation theory: Evolutionary paths and future advances. *Organization Studies*, 27(8), pp. 1179-1208.

Noorderhaven, N. and Harzing, A. W. (2009). Knowledge-sharing and social interaction within MNEs. *Journal of International Business Studies*, 40(5), pp. 719-741.

Nunnally, J. C. (1978). *Psychometric theory, Second edition*. New York: McGraw-Hill/Irwin.

Osterloh, M. and Frey, B. S. (2000). Motivation, knowledge transfer, and organizational forms. *Organization Science*, 11(5), pp. 538-550.

Osterman, P. (2000). Work reorganization in an era of restructuring: Trends in diffusion and effects on employee welfare. *Industrial and Labor Relations Review*, 53(2), pp. 179-196.

Pedersen, T., Petersen, B., and Sharma, D. (2003). Knowledge transfer performance of multinational companies. *Management International Review*, 43(3), pp. 69-90.

Persson, M. (2006). The impact of operational structure, lateral integrative mechanisms, and control mechanisms on intra-MNE knowledge transfer. *International Business Review*, 15(5), pp. 547-569.

Pfeffer, J. (1998). Seven practices of successful organizations. *California Management Review*, 40(2), pp. 96-124.

Pfeffer, J. (1995). Producing Sustainable competitive advantage through the effective management of people. *Academy of Management Executive*, 9(1), pp. 55-69.

Pfeffer, J. (1994). *Competitive advantage through people: Unleashing the power of the work force*. Massachusetts: Harvard Business School Press.

Polanyi, M. (1966). *The tacit dimension*. New York: Anchor Day Books.

Pudelko, M. and Harzing, A. (2008). The golden triangle for MNCs: Standardization towards headquarters practices, standardization towards global best practices and localization. *Organizational Dynamics*, 37(4), pp. 394-404.

Pudelko, M. and Harzing, A. (2007). Country-of-origin, localization, or dominance effect? An empirical investigation of HRM practices in foreign subsidiaries. *Human Resource Management*, 46(4), pp. 535-559.

Purcell, J. and Hutchinson, S. (2007). Front-line managers as agents in the HRM performance causal chain: Theory, analysis, and evidence. *Human Resource Management Journal*, 17(1), pp. 3-20.

Reagans, R. and McEvily, B. (2003). Network structure and knowledge transfer: The effect of cohesion and range. *Administrative Science Quarterly*, 48(2), pp. 240-267.

Riesenberger, J. R. (1998). Knowledge: The source of sustainable competitive advantage. *Journal of International Marketing*, 6(3), pp. 94-107.

Robbins, S. P. (2005). *Organizational behavior, Eleventh edition*. New Jersey: Prentice Hall.

Robertson, M., Scarbrough, H., and Swan, J. (2003). Knowledge creation in professional service firms: Institutional effects. *Organization Studies*, 24(6), pp. 831-857.

Rosenzweig, P. M. and Nohria, N. (1994). Influences on human resource management practices in multinational corporations. *Journal of International Business Studies*, 25(2), pp. 229-251.

Roth, J. (2003). Enabling knowledge creation: Learning from an R&D organization. *Journal of Knowledge Management*, 7(1), pp. 32-48.

Rousseau, D. M. (2011). Reinforcing the micro/macro bridge: Organizational thinking and pluralistic vehicles. *Journal of Management*, 37(2), pp. 429-442.

Rowley, T., Behrens, D., and Krackhardt, D. (2000). Redundant governance structures: An analysis of structural and relational embeddedness in the steel and semiconductor industries. *Strategic Management Journal*, 21(3), pp. 369-386.

Rucci, A. J. (2009). The pursuit of HR's core purpose: The practical doing of strategic HRM. *Routledge companion to strategic human resource management*. Eds. Storey, J., Wright, P. M., and Ulrich, D. London: Routledge, pp. 137-164.

Ruekert, R. W. and Walker, O. C. (1987). Interactions between marketing and R&D departments in implementing different business strategies. *Strategic Management Journal*, 8(3), pp. 233-248.

Ryan, G. W. and Bernard, H. R. (2000). Data management and analysis methods. *Handbook of qualitative research, Second edition*. Eds. Denzin, N. K. and Lincoln, Y. S. London: Sage Publications, pp. 769-802.

Rynes, S. L., Bartunek, J. M., and Daft, R. L. (2001). Across the great divide: Knowledge creation and transfer between practitioners and academics. *Academy of Management Journal*, 44(2), pp. 340-355.

Sarantakos, S. (2005). *Social research, Third edition*. New York: Palgrave Macmillan.

Saxenian, A. (1994). *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Massachusetts: Harvard University Press.

Scheiner, S. M. (2001). Multiple response variables and multi-species interactions. *Design and analysis of ecological experiments, Second edition*. Eds. Scheiner, S. M. and Gurevitch, J. New York: Chapman and Hall, pp. 99-115.

Schlegelmilch, B. B. and Chini, T. C. (2003). Knowledge transfer between marketing functions in multinational companies: A conceptual model. *International Business Review*, 12(2), pp. 215-232.

Schuler, R. and Jackson, S. (1987). Linking competitive strategies and human resource practices. *Academy of Management Executive*, 1(3), pp. 207–219.

Schulz, M. (2003). Pathways of relevance: Exploring inflows of knowledge into subunits of multinational corporations. *Organization Science*, 14(4), pp. 440-459.

Schulz, M. (2001). The uncertain relevance of newness: Organizational learning and knowledge flows. *Academy of Management Journal*, 44(4), pp. 661-681.

Sessa, V. I. and London, M. (2006). *Continuous learning in organizations: Individual, group, and organizational perspectives*. New Jersey: Lawrence Erlbaum Associates.

Shiffler, R. E. and Adams, A. J. (1987). A correction for biasing effects of pilot sample size on sample size determination. *Journal of Marketing Research*, 24(3), pp. 319-321.

Siegel, A. F. (2002). *Practical business statistics, Fifth edition*. New York: McGraw-Hill/Irwin.

Simonin, B. L. (1999a). Transfer of marketing know-how in international strategic alliances: An empirical investigation of the role and antecedents of knowledge ambiguity. *Journal of International Business Studies*, 30(3), pp. 463-490.

Simonin, B. L. (1999b). Ambiguity and the process of knowledge transfer in strategic alliances. *Strategic Management Journal*, 20(7), pp. 595-623.

Smale, A. (2008) Global HRM integration: A knowledge transfer perspective. *Personnel Review*, 37(2), pp. 145-164.

Snell, S. A., Lepak, D. P., Dean, J. W. Jr., and Youndt, M. A. (2000). Selection and training for integrated manufacturing: The moderating effects of job characteristics. *Journal of Management Studies*, 37(3), pp. 445-466.

Song, J., Asakawa, K., and Chu, Y. (2011). What determines knowledge sourcing from host locations of overseas R&D operations?: A study of global R&D activities of Japanese multinationals. *Research Policy*, 40(3), pp. 380-390.

Souder, W. E. and Moenaert, R. K. (1992). Integrating marketing and R&D project personnel within innovation projects: An information uncertainty model. *Journal of Management Studies*, 29(4), pp. 485-512.

Staples, D. S. and Webster, J. (2008). Exploring the effects of trust, task interdependence and virtualness on knowledge sharing in teams. *Information Systems Journal*, 18(6), pp. 617-640.

Stavrou, E. T., Brewster, C., and Charalambous, C. (2010). Human resource management and firm performance in Europe through the lens of business systems: Best fit, best practice or both?. *International Journal of Human Resource Management*, 21(7), pp. 933-962.

Stevens, M. J. and Campion, M. A. (1994). The knowledge, skill, and ability requirements for teamwork: Implications for human resource management. *Journal of Management*, 20(2), pp. 503-530.

Stevens, S. S. (1963). Operationism and logical positivism. *Theories in contemporary psychology*. Ed. Marx, M. H. New York: Palgrave MacMillan, pp. 47-76.

Stevens, S. S. (1939). Psychology and the science of science. *Psychological Bulletin*, 36(4), pp. 221-263.

Stewart, G. L. and Barrick, M. R. (2000). Team structure and performance: Assessing the mediating role of intrateam process and the moderating role of task type. *Academy of Management Journal*, 43(2), pp. 135-148.

Stiles, P., Wright, P., Paauwe, J., Stahl, G., Trevor, J., Farndale, E., Morris, S., and Björkman, I. (2006). *Best practice and key themes in global human resource management: Project report*. GHRRA.

Subramaniam, M. and Venkatraman, N. (2001). Determinants of transnational new product development capability: Testing the influence of transferring and deploying tacit overseas knowledge. *Strategic Management Journal*, 22(4), pp. 359-378.

Sun, L., Aryee, A., and Law, K. S. (2007). High-performance human resource practices, citizenship behaviour, and organizational performance: A relational perspective. *Academy of Management Journal*, 50(3), pp. 558-577.

Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 17, pp. 27-43.

Tabachnick, B. G. and Fidell, L. S. (1989). *Using multivariate statistics, Second edition*. New York: Harper & Row.

Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing, and public policy. *Research Policy*, 15(6), pp. 285-305.

Te'eni, D. (2001). Review: A cognitive-affective model of organizational communication for designing IT. *MIS Quarterly*, 25(2), pp. 251-312.

Teigland, R. and Wasko, M. M. (2003). Integrating knowledge through information trading: Examining the relationship between boundary spanning communication and individual performance. *Decision Sciences*, 34(2), pp. 261-286.

Thomas, E. J. (1957). Effects of facilitative role interdependence on group functioning. *Human Relations*, 10(4), pp. 347-366.

Thompson, B. (2004). *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. Washington, DC: American Psychological Association.

Thompson, J. D. (1967). *Organizations in action: Social science bases of administrative theory*. New York: McGraw-Hill.

Truss, C. (2001). Complexities and controversies in linking HRM with organizational outcomes. *Journal of Management Studies*, 38(8), pp. 1121-1149.

Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovations and performance. *Academy of Management Journal*, 44(5), pp. 996-1004.

Tsai, W. and Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of management Journal,* 41(4), pp. 464-476.

Ulrich, D. and Beatty, D. (2001). From partners to players: Extending the HR playing field. *Human Resource Management*, 40(4), pp. 293-307.

Vance, C. M. and Paik, Y. (2005). Forms of host-country national learning for enhanced MNC absorptive capacity. *Journal of Managerial Psychology*, 20(7), pp. 590-606.

Vance, C. M., Vaiman, V., and Andersen, T. (2009). The vital liaison role of host country nationals in MNC knowledge management. *Human Resource Management*, 48(4), pp. 649-659.

Van Den Bosch, F. A. J., Volberda, H. W., and De Boer, M. (1999). Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities. *Organization Science*, 10(5), pp. 551-568.

Van der Vegt, G. S. and Janssen, O. (2003). Joint impact of interdependence and group diversity on innovation. *Journal of Management*, 29(5), pp. 729-751.

Van de Ven, A. H. and Walker, G. (1984). The dynamics of interorganizational coordination. *Administrative Science Quarterly*, 29(4), pp. 598-621.

Verma, A. and Fang, T. (2003). Workplace innovation and union status: Synergy or strife?. In *Proceedings of the 55th Annual Meeting, Industrial Relations Research Association*, pp. 189–190. IRRA; 1999.

Wageman, R. (1995). Interdependence and group effectiveness. *Administrative Science Quarterly*, 40(1), pp. 145-180.

Walsham, G. (2001). Knowledge management: The benefits and limitations of computer systems. *European Management Journal*, 19(6), pp. 599-608.

Wang, P., Tong, T. W., and Koh, C. P. (2004). An integrated model of knowledge transfer from MNC parent to China subsidiary. *Journal of World Business*, 39(2), pp. 168-182.

Webb, E. J., Campbell, D. T., Schwartz, R. D., and Sechrest, L. (1966). *Unobtrusive measures: Non-reactive research in the social sciences*. Illinois: Rand McNally.

Winter, S. G. (1987). Knowledge and competence as strategic assets. *The competitive challenge: Strategies for industrial innovation*. Ed. Teece, D. J. Massachusetts: Ballinger, pp. 159-184.

Woodward, J. (1965). *Industrial organization: Theory and practice*. London: Oxford University Press.

Worley, C. G., Bowen, D. E., and Lawler, E. E. (1992). On the relationship between objective increases in pay and employees' subjective reactions. *Journal of Organizational Behavior*, 13(6), pp. 559-571.

Wright, P. M. and McMahan, G. C. (1992). Theoretical perspectives for strategic human resource management. *Journal of Management*, 18(2), pp. 295-320.

Wright, P. M. and Snell, S. A. (1998). Towards a unifying framework for exploring fit and flexibility in strategic human resource management. *Academy of Management Review*, 23(4), pp. 756-772.

Wright, P. M. and Snell, S. A. (1991). Toward an integrative view of strategic human resource management. *Human Resource Management Review*, 1(3), pp. 203-225.

Wright, P. M., Gardner, T. M., Moynihan, L. M., and Allen, M. R. (2005a). The relationship between HR practices and firm performance: Examining causal order. *Personnel Psychology*, 58(2), pp. 409-447.

Wright, P. M., Snell, S. A., and Dyer, L. (2005b). New models of strategic HRM in a global context. *International Journal of Human Resource Management*, 16(6), pp. 875-881.

Yeung, A. K, Ulrich, D. O., Nason, S. W., and Von Glinow, M. A. (1999). *Organizational learning capability: Generating and generalizing ideas with impact*. New York: Oxford University Press.

Youndt, M. A., Snell, S. A., Dean, J. W., and Lepak, D. P. (1996). Human resource management, manufacturing strategy, and firm performance. *Academy of Management Journal,* 39(4), pp. 836-866.

Zack, M. H. (1999). Managing codified knowledge. *Sloan Management Review*, 40(4), pp. 45-58.

Zander, U. and Kogut, B. (1995). Knowledge and the speed of transfer and imitation of organizational capabilities: An empirical test. *Organization Science*, 6(1), pp. 76-92.

Zárraga, C. and Bonache, J. (2005). The impact of team atmosphere on knowledge outcomes in self-managed teams. *Organization Studies*, 26(5), pp. 661–681.

Zhao, Z., Anand, J., and Mitchell, W. (2005). A dual networks perspective on inter-organizational transfer of R&D capabilities: International joint ventures in the Chinese automotive industry. *Journal of Management Studies*, 42(1), pp. 127-160.

Zheng, C., Morrison, M., and O'Neill, G. (2006). An empirical study of high performance HRM practices in Chinese SMEs. *International Journal of Human Resource Management*, 17(10), pp. 1772-1803.

Appendix 1. Survey Questionnaire

No. 12345678[43]

Questionnaire

A Study by Warwick Business School

Thank you very much for taking the time to fill in this questionnaire. This is an academic research on understanding the linkage between HRM practices and the strategic development of knowledge. This questionnaire will not record your identity and all the data will be used for academic purposes only.

If you have any queries about this survey, please contact Euk Hwan Kim at Warwick Business School:

Phone: +44 (0)24 7652 8553
Fax: +44 (0)24 7652 4184
E-Mail: Euk.Kim@warwick.ac.uk

Guidance for Completing the Questionnaire

This page provides some information to complete the questionnaire. Please take a few minutes to read them carefully.

• **Aim of the research.** The project aims to identify how marketing and R&D knowledge is strategically generated in multinational companies (MNCs) as well as how HRM can promote the process. We are interested in your experience of the **PROCESS** through which knowledge is created. We are **NOT** asking you to reveal anything about knowledge itself.

• **Advantages for you.** You will have an opportunity to express your views on several issues related to your work and then the conclusion of this study can provide valuable suggestions on firm strategy and HRM practices. They may improve your work processes so that your company can achieve organisational goals more effectively. This questionnaire will **NOT** take much time from you.

• **How you can help.** We are conducting a survey intended to be completed by **MARKETERS/SALESMEN** and **R&D ENGINEERS/DESIGNERS** in electronics, automotive, and IT S/W MNCs. There are no right or wrong answers. Please express what you really think and then put your completed questionnaire in the free post envelope provided. We hope that the sealed envelope will be sent **by the 31st of October.**

Thank you for your co-operation.

Please note:
If you do not have experience working in R&D or marketing, please forward this questionnaire to someone who does. The term, **KNOWLEDGE**, means a set of **intellectual property** that includes ideas, skills, know-how, information, and strategies in **technical processes** and **business developments.**

[43] 1st: Location; 2nd: Sector; 3rd and 4th: Company; 5th: HQ or Subsidiary; 6th, 7th, and 8th: Distribution.

SECTION 1. YOUR EXPERIENCE in Knowledge Creation

This questionnaire asks you to think of a TYPICAL PROJECT related to technical or business developments in which you have been engaged within your present company. Please tell us your experience in TEAM RELATIONSHIPS during the project by answering the following questions.

Please tick the appropriate box on the following scale:

1: Never	2: Seldom	3: Sometimes	4: Often	5: Almost Always

A Socializing with Team Members	Never 1	2	3	4	Almost Always 5
I have informal meetings with the members of my project team in taking a kind of coffee, tea, breakfast, or lunch breaks.	☐	☐	☐	☐	☐
I attend informal activities to spend free-time with colleagues outside the workplace.	☐	☐	☐	☐	☐
The work structure of my team supports such informal activities.	☐	☐	☐	☐	☐
I am involved in activities related to mentoring or apprenticeships.	☐	☐	☐	☐	☐
I share ideas, skills, or know-how with colleagues in formal meetings.	☐	☐	☐	☐	☐
The work structure of my team supports such formal activities.	☐	☐	☐	☐	☐
Team members share beliefs, values, and ways of thinking.	☐	☐	☐	☐	☐
The corporate mission, vision, values, and history are shared in firm systems.	☐	☐	☐	☐	☐
My organisation promotes interactions across teams.	☐	☐	☐	☐	☐

B Presenting Ideas to Team Members	Never 1	2	3	4	Almost Always 5
My team members present ideas in formal work structures and team collaboration tools.	☐	☐	☐	☐	☐
My team utilizes metaphors, analogies and models to clarify concepts and ideas.	☐	☐	☐	☐	☐
Organisational daily routines are documented in organisational schemes, flow charts, and other work processes.	☐	☐	☐	☐	☐

C Utilizing What is Existing	Never 1	2	3	4	Almost Always 5
The information contained in files and databases is classified, accessed, and reused.	☐	☐	☐	☐	☐
My team members shorten, add, combine, and classify available information to develop written reports.	☐	☐	☐	☐	☐

D Using IT Tools	Never 1	2	3	4	Almost Always 5
I informally talk with team members through web-space such as wikis and blogs.	☐	☐	☐	☐	☐
Team members exchange data through information and communication technologies such as intranets, corporate networks, and company software.	☐	☐	☐	☐	☐

SECTION 2. YOUR EXPERIENCE in Knowledge Transfer

Please tell us your experience related to KNOWLEDGE SHARING in a project for technical or business developments by answering the following questions.

Please tick the appropriate box on the following scale:

1: Never	2: Seldom	3: Sometimes	4: Often	5: Almost Always

A Knowledge Required for a New Project	Never 1	2	3	4	Almost Always 5
A supplier as a corporate partner provides my team with information or any other support required for a new project.	☐	☐	☐	☐	☐
A buyer as a corporate partner provides my team with information or any other support required for a new project.	☐	☐	☐	☐	☐
An external agency provides my team with information or any other support required for a new project.	☐	☐	☐	☐	☐
An academic institution provides my team with information or any other support required for a new project.	☐	☐	☐	☐	☐
A foreign organisation of my company provides my team with information or any other support required for a new project.	☐	☐	☐	☐	☐
Any other external partner provides my team with information or any other support required for a new project.	☐	☐	☐	☐	☐
The head organisation of my company provides my team with information or any other support required for a new project.	☐	☐	☐	☐	☐

B Knowledge Created in a New Project	Never 1	2	3	4	Almost Always 5
My team and the head organisation of my company have online or offline meetings to explain and discuss the contents of documents related to new knowledge.	☐	☐	☐	☐	☐
My team and a foreign organisation of my company have online or offline meetings to explain and discuss the contents of documents related to new knowledge.	☐	☐	☐	☐	☐
The perspectives, insights, points of view, and mental models of my company are shaped from data, information, or new knowledge developed by my team.	☐	☐	☐	☐	☐
My company learns skills or know-how from data, information, or new knowledge developed by my team.	☐	☐	☐	☐	☐

SECTION 3. YOUR VIEWS on the Project Environment

Please tell us your opinion on ENVIRONMENTAL FACTORS in a project for technical or business developments by answering the following questions.

Please tick the appropriate box on the following scale:

1: Not True At All	2: Slightly True	3: Moderately True	4: Very True	5: Extremely True

A Working Conditions

	Not At All True 1	2	3	4	Extremely True 5
There is a clear distinction between preceding and succeeding roles in a project and thus members do not have joint duties.	☐	☐	☐	☐	☐
Company leaders carefully listen to what my team members say on project matters.	☐	☐	☐	☐	☐
My organisation is located near an external organisation to get information or any other support for projects.	☐	☐	☐	☐	☐
My organisation can make its own decision about local strategies rather than being influenced by a parent company.	☐	☐	☐	☐	☐
My organisation can make its own decision about HR/financial resources rather than being influenced by a parent company.	☐	☐	☐	☐	☐
A project team competes with any other organisation of my parent company in the same project.	☐	☐	☐	☐	☐
My organisation makes an effort for organisational integration.	☐	☐	☐	☐	☐
My organisation highly values racial, cultural or sexual diversity to create various ideas.	☐	☐	☐	☐	☐
Team members are asked to participate in deciding something important in projects.	☐	☐	☐	☐	☐
Colleagues switch duties at frequent intervals compared to other companies.	☐	☐	☐	☐	☐

B Protection Modes

	Not At All True 1	2	3	4	Extremely True 5
Other firms cannot easily develop our project outcomes because of the law.	☐	☐	☐	☐	☐
Other firms cannot easily develop our project outcomes because of our protective systems.	☐	☐	☐	☐	☐
Other firms cannot easily develop our project outcomes because of a unique historical background.	☐	☐	☐	☐	☐
Other firms cannot easily develop our project outcomes because of our work environments based on complex social interactions.	☐	☐	☐	☐	☐
It is difficult for even professionals to understand some particular mechanisms, formulae, or processes used in projects.	☐	☐	☐	☐	☐

C Project Teams

(Please tick the appropriate box on the basis of your experience.)

How many people do you normally work with in your team?

1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25 or More
☐	☐	☐	☐	☐	☐	☐	☐	☐

How many projects have you been involved in over the past 1 year?

1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	49-51
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
52-54	55-57	58-60	61-63	64-66	67-69	70-72	73-75	76-78	79-81	82-84	85-87	88-90	91-93	94-96	97-99	100 ≤
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

How long did the projects above last?

The shortest project duration

1-3 Months	4-6 M	7-9 M	10-12 M	13-15 M	16-18 M	19-21 M	22-24 M	25 M or More
☐	☐	☐	☐	☐	☐	☐	☐	☐

The longest project duration

1-3 Months	4-6 M	7-9 M	10-12 M	13-15 M	16-18 M	19-21 M	22-24 M	25 M or More
☐	☐	☐	☐	☐	☐	☐	☐	☐

How important are the following mechanisms for international knowledge exchange in your company?

	1 Not Important at all	2	3 Neutral	4	5 Very important	Any comments about why using it or not if there is a reason
Expatriates	☐	☐	☐	☐	☐	
International Working Groups	☐	☐	☐	☐	☐	
International Assignments	☐	☐	☐	☐	☐	
Other (Please identify)						

SECTION 4. YOUR VIEWS on HRM Practices

Please tell us your opinion on MANAGERIAL ACTIVITIES, which influence a project for technical or business developments by answering the following questions.

Please tick the appropriate box on the following scale:

1: Not At All True	2: Slightly True	3: Moderately True	4: Very True	5: Extremely True

A	Our recruitment and staffing are related to the following statement.	Not At All True				Extremely True
		1	2	3	4	5
	Targeted selection supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Internal promotion or selection to fill vacant positions supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Merit-based promotion supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Job rotation is provided for employees to develop a wider range of experience.	☐	☐	☐	☐	☐

B	Our planning and appraisal are related to the following statement.	Not At All True				Extremely True
		1	2	3	4	5
	An accurate job description by formal job analysis supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	A formal performance appraisal system supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Developmental appraisal accompanied by constructive feedback supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Regular use of employee attitude surveys supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	My organisation values group responsibilities above individual responsibilities.	☐	☐	☐	☐	☐
	My organisation values individual responsibilities above group responsibilities.	☐	☐	☐	☐	☐

C	Our compensation and benefits are related to the following statement.	Not At All True				Extremely True
		1	2	3	4	5
	Performance-based pay supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Performance appraisal criteria are multidimensional.	☐	☐	☐	☐	☐
	Performance appraisal criteria are fair.	☐	☐	☐	☐	☐
	Various benefits are provided to compensate imperfect performance appraisals.	☐	☐	☐	☐	☐

D	Our training and development are related to the following statement.	Not At All True				Extremely True
		1	2	3	4	5
	Sufficient opportunities for training and development support knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Training programs are provided for employees to learn new skills.	☐	☐	☐	☐	☐
	Leadership training programs are provided for effective project management.	☐	☐	☐	☐	☐

E	Our work environment is related to the following statement.	Not At All True				Extremely True
		1	2	3	4	5
	Closely working with team members supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Participation in the decision-making supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Reducing differentials between managers and other employees supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Formal communication programs linking employees to the firm support knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	Job security policies support knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐
	A formal grievance or complaint resolution system supports knowledge creation and sharing in my organisation.	☐	☐	☐	☐	☐

If any other specific arrangement in HRM supports knowledge creation and sharing, please identify:

_____

SECTION 5. BACKGROUND INFORMATION

This last section has questions that will ONLY be used to group your responses with others of similar backgrounds. Please check the relevant box for each question or write in the appropriate response.

Age: _____ Gender: ☐ Male ☐ Female

Educational Background (Major and Degree): _____

Level of Management:

☐ Top ☐ Middle ☐ Lower ☐ Other (Please identify): _____

You are working in:

☐ Marketing ☐ Sales ☐ R&D (Engineering) ☐ R&D (Design) ☐ HR ☐ Strategy

Number of years working in the field / in the company / in your position:

_____ / _____ / _____

Product Category Related to Your Duty:

☐ Small Multimedia Products ☐ Large Multimedia Products ☐ Semiconducting Products ☐ Mobile Phones ☐ Computers ☐ Small Home Appliances ☐ Large Home Appliances ☐ Medical Products ☐ Industrial Product ☐ S/W ☐ Cars ☐ Motorcycles ☐ Commercial Vehicles ☐ Others

This is the end of the questionnaire. Thank you for taking the time out of your busy day to complete this survey. Your co-operation is greatly appreciated.

If you would like to receive a summary report of the research findings, please leave your e-mail address.

_____

Please put the completed questionnaire in the pre-paid envelope and send it to:

Euk Hwan Kim, Doctoral Researcher, Warwick Business School, University of Warwick, Coventry, CV4 7AL, The United Kingdom

Appendix 2. Interview Protocol and Questions

Questions for a Group Discussion

1. Introduction (5 minutes)

1) Appreciation and Objectives

Good afternoon, and welcome to our meeting. First of all, I would like to thank you all for coming today and I look forward to hearing your experience. My name is Kim, a doctoral researcher at the University of Warwick.

I am currently involved in a study managed by IRRU (Industrial Relations Research Unit) and IKON (Innovation, Knowledge and Organisational Networks) research centres. This study aims to identify mechanisms linking HRM practices to the development of knowledge resources in addressing effective knowledge generation processes and necessary HRM practices in marketing and R&D units.

You were asked to attend because you are a marketer (or an R&D researcher) who works in a typical project related business developments (or technical developments). Please feel free to share your point of view even if it differs from what others have said. There are no right or wrong answers but different points of view.

2) Ground Rules

Can we establish some ground rules? First, please feel free to speak. Second, one person should talk at a time (if a group interview). Third, I will be recording the discussion so that I can listen to it afterwards, to ensure that I represent your experience and views accurately. If several people are talking at the same time, I may not capture the comments clearly. Finally, the duration of this discussion will be approximately 1 hour and 20 minutes. I have provided you with a set of topics to structure the discussion. Interview questions for five themes will be asked.

Before we begin, do you have any questions?

2. Opening Questions

Would you tell us your name and job responsibility? And if you do not mind, please tell me about your educational background. Also, how long have you worked in this subsidiary? And how many projects have you worked on in this subsidiary?

Let's define the term, projects, as collaborative assignments planned to achieve a particular aim in technical (or business) developments. You may think about shared activities to achieve a particular task, such as devising a marketing plan for a product.

For example, when a marketing plan is assigned to a team, members will create ideas and strategies through the 4P analysis, the STP analysis, or something else. The goal is to build strategies for a new business. At this time, knowledge can be contents included in the marketing report.

Interviewees are likely to take one of the following responsibilities: 1) Marketing Strategy (Planning) / 2) Market Research and Analysis / 3) Channel Management (Distribution) / 4) Product Management (Promotions • Producing Marketing Materials • Event Organising) / 5) Brand Management / 6) Marketing Communications (PR – Consumer and Business • Sponsorship • Website Contents) / 7) Direct Marketing (Social Media Management - Advertising)

3. Key questions: When interviewees do not talk about an open question enough, more closed questions are asked.

1) Knowledge Creation

(Open Question)

Please think about significant recent projects. It might be to build a marketing strategy, a sales manual, or something else in business developments (or technical developments). Can we talk about what projects you have been involved in to pick out 2-3 key projects? I want us to discuss the processes of 2-3 key projects.

I do not want to know any confidential information in the projects but knowledge creation process related to sharing ideas and information. Can we talk about how typical projects were designed and operated?

(Additional Questions)

Designed by the headquarters or one of you? Operated by a team? How do you determine responsibility for each member? What about work structure in your team? Any support by your company?

(More Closed Questions)

Here are more specific questions about informal and formal activities. Section 1-A in the questionnaire shows some examples. What kind of informal activities do you experience in knowledge creation? What kind of formal activities do you experience in knowledge creation? How do your team structures or wider company systems support such activities?

Please look at Section 1-B if helpful. How do you present your ideas in work structures? Do you use any team tools, organisational schemes, or charts? Are there any special features to encourage members to express and organise ideas in your organisation?

Here are some examples in Section 1-C. Knowledge can be reused in your organisation. Have you had any experience of exchanging a kind of developed knowledge with peers in order to create any other knowledge in your subsidiary?

2) Knowledge Transfer

(Open Question)

How was the project related to other firms or to the headquarters? You may think about getting or giving a kind of support.

(More Closed Questions)

Please look at the Section 2-A & B of the questionnaire if helpful. You might have a relationship with the HQs or other organisations for knowledge transfer. Do other organisations transfer knowledge (business or technical information) to your subsidiary? What is it for?

Does your subsidiary transfer knowledge (business or technical information) to other organisations (including HQs)? What is it for?

Would you explain work relationships with your HQs? Is there a mode to promote work processes mentioned?

3) Particular Local Features

Would you tell me a bit more regarding work structures, work processes, team relationships, and conditions for project success? You may talk about some of the questionnaire Section 3.

4) Particular Cross-National Features

Would you tell me a bit more regarding corporate strategies for cross-national work design, subsidiary autonomy, responsibilities, competition, work cycles, geographical considerations, diversity, organisational integration, decision-making, and leadership? You may talk about some of the questionnaire Section 3.

5) HRM Practices Perceived by Employees

(Open Question)

What are organisational practices that encourage or impede knowledge creation and transfer? You may think about job rotation across areas, internal selection to fill vacant positions, or incentives for your projects. What is good or bad?

(More Closed Questions)

If any idea does not occur to you, you may think about some more items in the survey questionnaire Section 4. Does your company have any particular features related to them? What is helpful or helpless for your projects?

How are tasks assigned to individuals, teams, or bigger groups?

4. Summary and Conclusion (5-10 minutes)

To conclude, can we recap on the main issues that have been discussed? They are: (summarizing issues discussed). Is there anything missing? Are there any particular external conditions that may influence your project? A financial crisis, a kind of organisational climate, or a government policy for your product may be an example.

5. Ending Questions

Do you have any other opinions? Is there anything else of importance or relevance that you would like to add?

6. Thanks: I deeply appreciate your co-operation in taking the time out of

your busy day.

※ For another 15 minutes, I may request interviewees and their peers to complete a questionnaire.

Appendix 3. Letter for Research Fieldwork

IRRU/IKON Research Centre
Warwick Business School
The University of Warwick
Coventry, CV4 7AL, UK

Tel: +44 (0)24 7652 8553
Fax: +44 (0)24 7652 4184

3rd November 2010

Dear Mr. Surin Cho / Mr. Paul Trueman,

HRM Practices and the Strategic Development of Knowledge

I am writing to ask for your help in the above research project that my supervisor, Prof. Paul K. Edwards, and I have established. The IRRU (Industrial Relations Research Unit) research centre is conducting it in the collaboration of the IKON (Innovation, Knowledge and Organisational Networks) research centre.

The project is studying the strategic knowledge generation system of multinational companies. It uses interviews and questionnaires to address effective knowledge generation processes and necessary HRM practices in relation to technical or business developments.

The project has the following specific elements.

• The aim of this research. The project aims to identify mechanisms linking HRM practices to the strategic development of knowledge resources in delivering how marketing knowledge as well as R&D knowledge is strategically generated in multinational companies and what HRM can do distinctively to motivate R&D and marketing employees in the process.

• How you can help. I would like to request '1 group interview with 3-5 low/mid-level employees', '2 individual interviews with low/mid-level employees', and '2 individual interviews with HR/strategy managers' in your subsidiary. A short self-completion questionnaire and following questions are given at this time. I am sure that these will **NOT** take much time from you. An attached questionnaire may help you understand that I will **NOT** have any complex questions.

Please remember that I do **NOT** want to know any confidential information and will **NEVER** ask you to reveal anything about knowledge itself.

I hope that the insights that are derived will be of value to your company in thinking about your organisational learning structures and their contribution to

successful business.

I would like to thank you for your co-operation and look forward to hearing from you. If you have any concerns, please do not hesitate to e-mail me at Euk.Kim@warwick.ac.uk.

Yours sincerely,

Euk Hwan Kim
Doctoral Researcher